DEC. 19 1958

PETROLEUM WEEK

A McGRAW-HILL PUBLICATION

Higher oil tariffs or mandatory controls? Petroleum Week recommends tariffs 60

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Air invades process stream cooling 36

Gas lines expand in the Southeast 40

Venezuela promises higher oil taxes 44

Will auto greases hit the skids? 48

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THE EYES OF THE OIL INDUSTRY

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.....CB&I–built reactors serve 1,000,000-gal. HOUDRIFORMER Process....

This high severity catalytic reformer unit converts almost a million gallons per day of low octane naphtha into high octane blending stocks.

The three CB&I-built reactors incorporated in the process handle upwards of 127,000 pounds of platinum catalyst per charge. They were fabricated of plates up to 5 inches thick . . . to meet the rigid specifications dictated by extremely high and controlled temperature and pressure conditions. In addition, the critical vessels were shop X-rayed and stress relieved to insure optimum performance and long service life.

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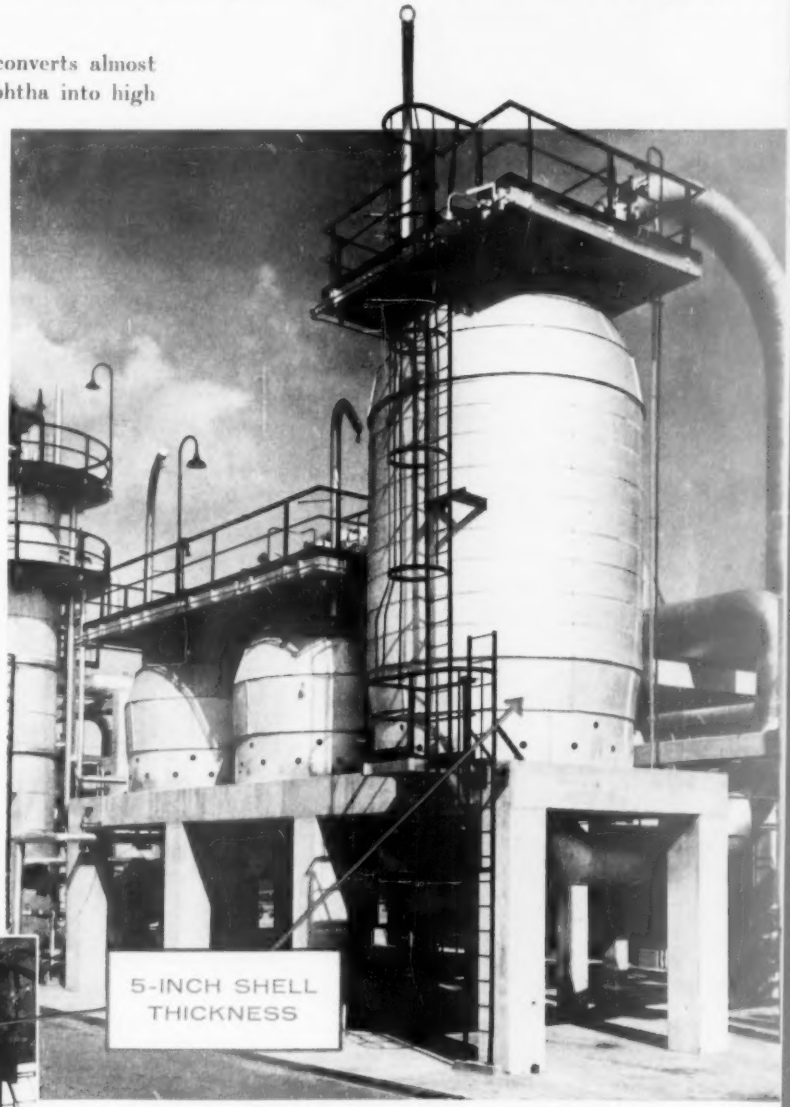
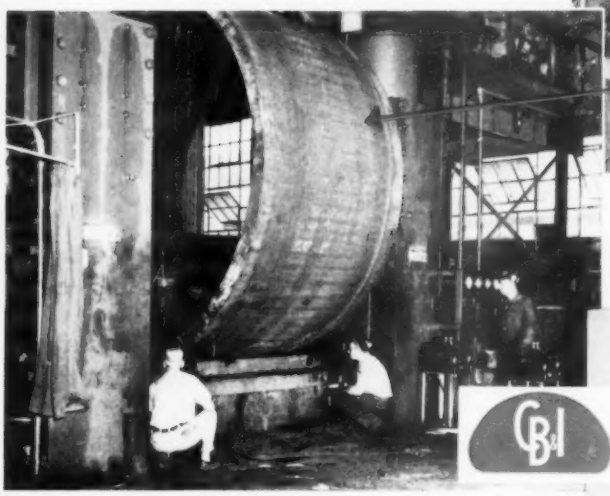
Creative fabrication, combined with experienced and *coordinated* engineering and erection services is the reason leading processors rely on CB&I for the tanks, towers and processing vessels which help to keep them abreast of petroleum progress. Write our nearest office for the bulletin: *CB&I Creative Craftsmanship in Steel.*



CB&I-built reactors contain catalyst for *Houdriformer*—high severity reforming process. Hydrogen by-product, generated in process, is recovered for use in another process that removes nitrogen and sulfur compounds from gasoline and propane.

Reactors were furnished through the Bechtel Corporation.



Five-inch thick plate for walls of large reactor (shown above) was fabricated at CB&I Birmingham plant.

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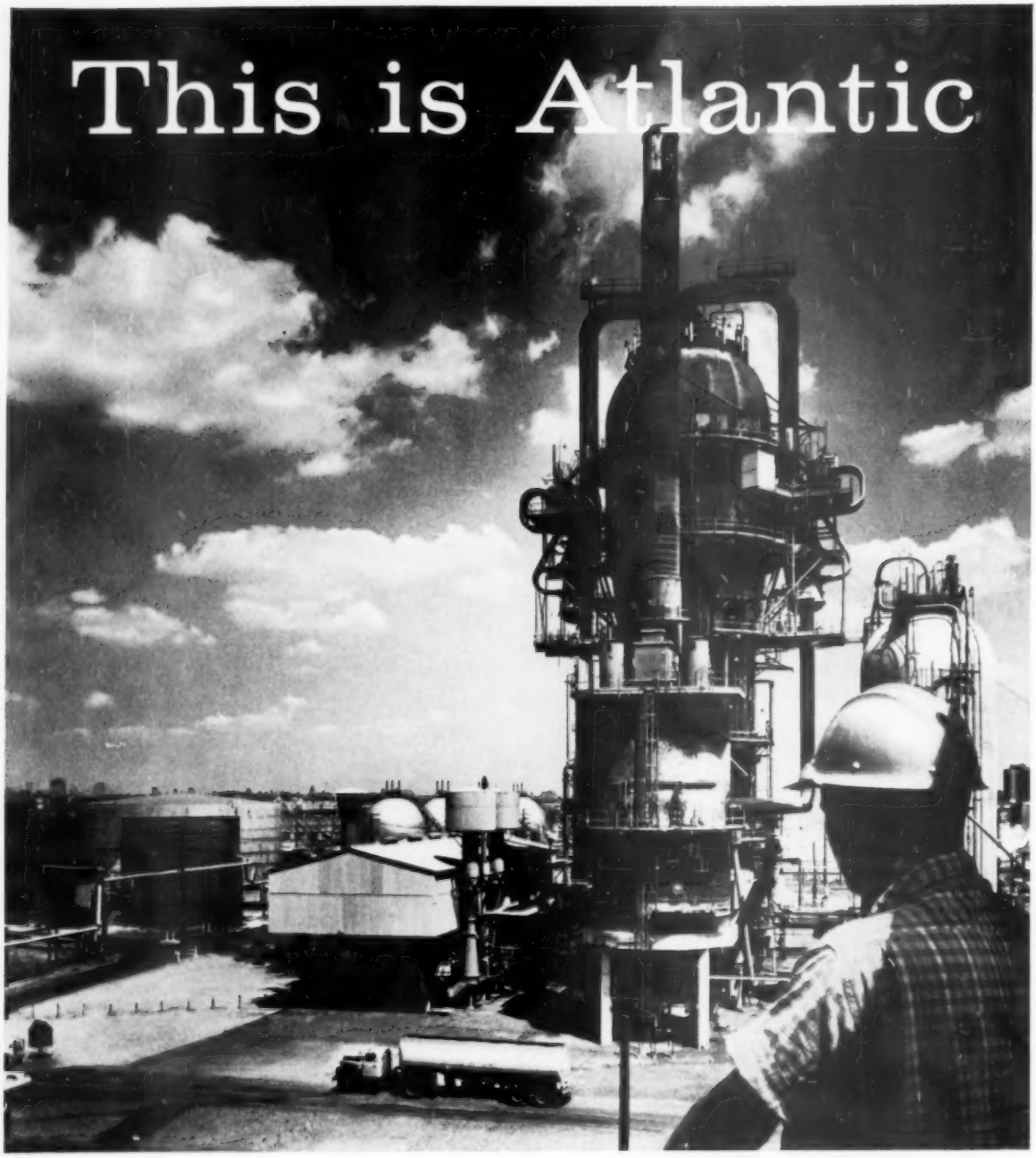

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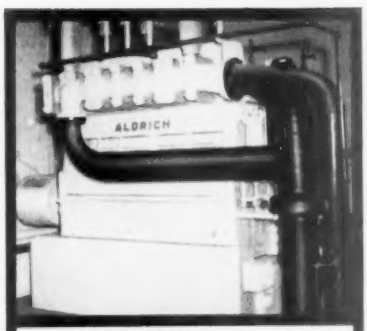

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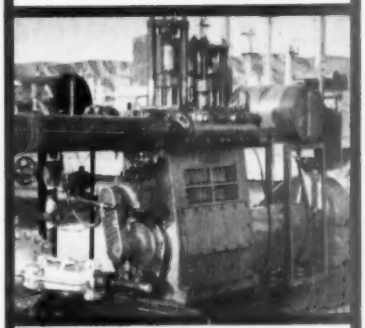

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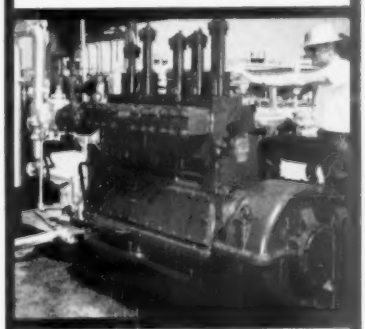

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TWO GREAT BANKS BECOME ONE - January 1

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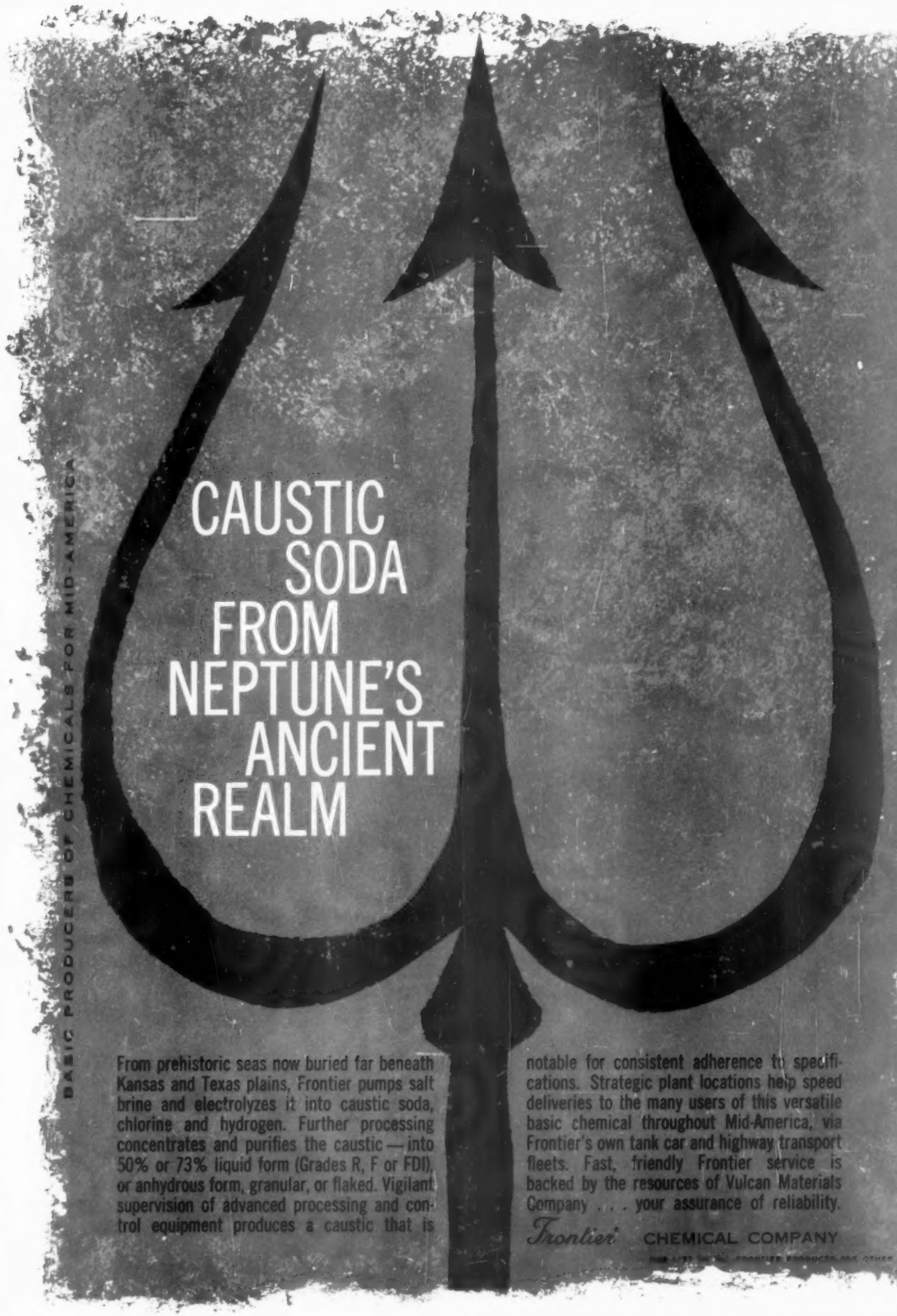
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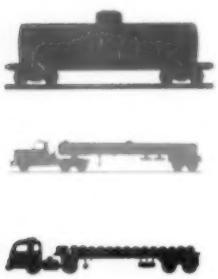

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DEPT/Letters

'More Constructive'

Dear Sir:

Your staff should be commended for the Special Report on petrochemicals (PW—Sep.19'58,p42). It should be especially appreciated by your readers in the petroleum industry.

Compilation of historical statistics is, of course, always easier than interpretation and projection. In the latter respect, I think you have done a good job of adding meat to the otherwise bare bones.

Your report presents a few opinions with which I might quarrel, but these are outweighed by judgments which I fully share and too seldom see in print. Not the least of these is your recognition of the growing desirability of more and better research, market development, and customer service. Your findings make clear the consequences of another, and perhaps more popular, policy which stresses the mere provision of producing capacity alone.

Your report seems more constructive than most of the petrochemical surveys I study.

W. H. SALZENBERG
GENERAL MANAGER
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How About Palm Trees?

Dear Sir:

Perhaps you can offer this comment to someone interested in the future design of service stations (PW—Nov.14'58,p114; Nov.21'58,p50):

I would prefer to stay in my air-conditioned car and have service stations build SHADE instead of lounges and patios. Shade has the best "eye-appeal" to me, and it's getting hard to find.

I. M. GLASSER
CORPUS CHRISTI, TEX.

PETROLEUM WEEK will publish from time to time comments from readers on timely, pertinent subjects. Expressions of opinions are welcomed; they should be kept as brief as possible.

Address all such correspondence to LeRoy Menzing, Editor, PETROLEUM WEEK, 330 W. 42nd St., New York 36, N. Y.

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of Christmas
be with you today
and throughout the New Year

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87 YEARS OF PROGRESS WITH THE OIL INDUSTRY

60-Second Summary / WHAT'S HAPPENING IN OIL

December 19, 1958

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Some first-class acreage may be made available for concession bids in Iraq. Iraq Petroleum Co., asked by the government to relinquish some of its territory so that new bids could be invited, is proposing to include some oil-promising tracts. . . . p. 15

•

Short on water, or finding it costly, some processors are turning to air-cooled heat exchangers. The trend to the use of air rather than water is relatively recent, but appears to be gaining momentum. . . . p. 36

•

The oil imports issue is far from permanent settlement. Regardless of what the Administration does now, disgruntled factions in or out of the industry are likely to seek congressional action. . . . p. 13

•

The first of the 1959 oil forecasts are moderately optimistic. For example, Continental Oil's L. F. McCollum thinks the industry's successful efforts to reduce stocks in 1958 has helped set the stage for a good year. . . . p. 15

•

An accurate aerial survey without ground stations or landmarks? It can be done, an aerial survey firm reports. And at a saving in time and cost, too. . . . p. 16

•

This has been a good year for exploration and drilling in southern Mississippi. The success ratio rose sharply over past years, chiefly because of deep plays. . . . p. 20

•

The Southeast is proving to be a ripe market for natural gas. The postwar industrial buildup, together with the growing population that accompanied it, has meant more potential customers for the gas transmission firms. . . . p. 40

•

The grease market may hit the skids even faster than some had anticipated. The reason: At least one 1960 automobile will have no grease fittings. However, there are some skeptics. . . . p. 48

•

Louisiana's Minden salt dome is a puzzler. Pan American Petroleum Corp. is now planning a two-way approach in an effort to get the answers. . . . p. 22

•

Hear Venezuela's Romulo Betancourt: "Oil policy must not become the property of any political group." For that reason, the president-elect says, the new oil policy advisory board will include representatives of all major parties—except the Communists—as well as business and civic groups. . . . p. 44

Up to the Minute / SIGNIFICANT LATE NEWS

AT-A-GLANCE Copyright PETROLEUM WEEK

December 19, 1958

Note how sales of liquefied petroleum gas continue to climb. Figures released this week show that 1958 sales are running 9.4% ahead of 1957, reaching an estimated 7.6-billion gal. The gain was even higher—15.2%—in domestic and commercial sales. As a motor fuel, however, LP-gas only gained at about the same rate as gasoline.

There has also been a substantial expansion in facilities to handle LP-gas. Twenty-six new plants came on stream during the year, and underground storage capacity increased almost 20%. Transportation developments were highlighted by the conversion of the Little Inch to products (including LP-gas).

•

The Federal Power Commission has started new hearings on proposed natural gas service to Chicago. An FPC examiner heard testimony this week on a $112-million project by Midwestern Gas Transmission Co. The firm wants to obtain gas from Tennessee Gas Transmission Co. and move 360-million cu. ft. daily into the Chicago area. A pipeline from near Nashville, Tenn., to a point near Chicago is included in the plans.

The application is not expected to encounter any serious opposition from other pipeline companies, although coal interests may object. Midwestern would sell its gas to three Chicago distributors but would not make industrial sales. The Chicago plan is a partial substitute for earlier plans of the companies—killed by FPC—to serve the Upper Midwest states.

•

The annual winter snarl of barge traffic in the Midwest is here again. Low water and ice along the Mississippi River and the Illinois Waterway are slowing barge deliveries of oil products. Even as far south as the area between St. Louis and Cairo, the low water has made sandbars a hazard.

•

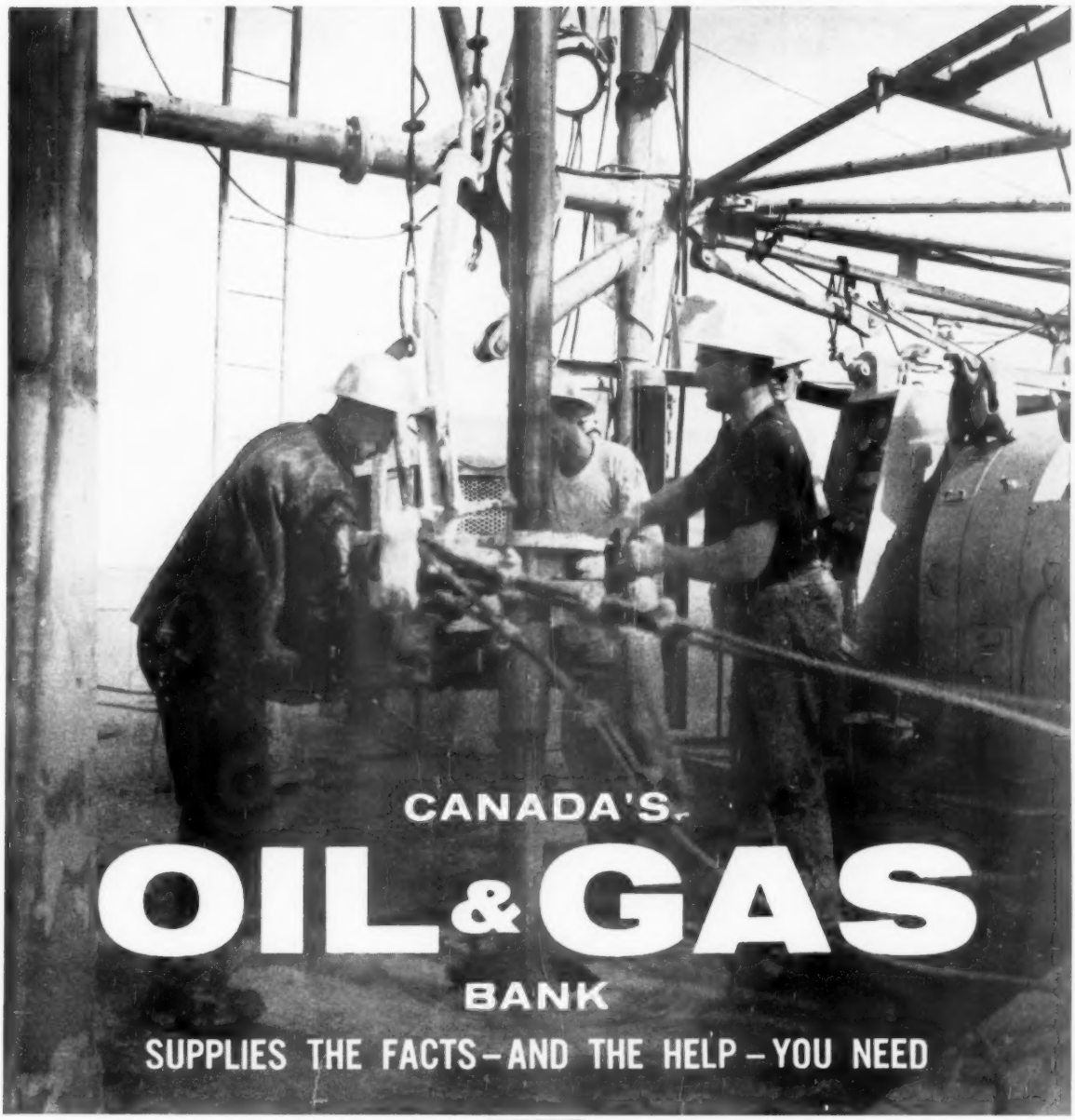
The Canadian Petroleum Assn. is urging its government to "beware of excessive regulation of the nation's energy resources." CPA thinks the Borden Commission went too far in that direction in its recent recommendations.

For example, CPA doesn't want a national energy board to have policy-making or regulatory power, as the Borden group suggested. Instead, CPA says, such a board should be only a fact-finding and advisory agency.

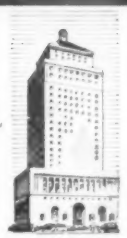
•

The State Dept. is conferring with Canadian and Venezuelan officials on the oil imports situation. Assistant Secretary of State Thomas Mann met this week in Washington with Venezuela's petroleum counselor, Carlos Perez de la Cova. Canadian oil officials have also been consulted.

A U. S.-Canadian economic meeting next month may include oil as a chief topic. Secretary of Commerce Lewis Strauss, Secretary of the Interior Fred Seaton, and Secretary of State John Foster Dulles will be among U. S. representatives in Ottawa Jan. 5-6.



On-the-spot banking facilities for oil and gas men are provided by The Royal Bank of Canada through more than 300 branches in Canada's western provinces. In addition, the "Royal's" Oil and Gas Department at Calgary—staffed with experienced oil bankers—provides a clearing house for the latest information on industry developments.



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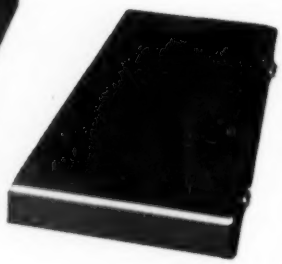
Fiberglass case (on all units) has integrally-molded steel brackets which provide a means of attaching straps for portable use.



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Rectilinear Presentation

The average weight of these units is 47 lbs. Yet this system is comparable in performance and flexibility to the most advanced fixed systems.

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We invite you to write for literature and arrange for a demonstration.

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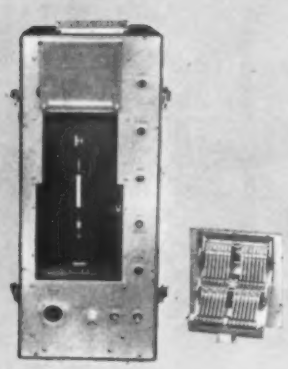
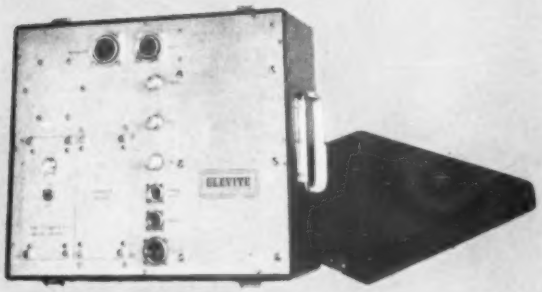
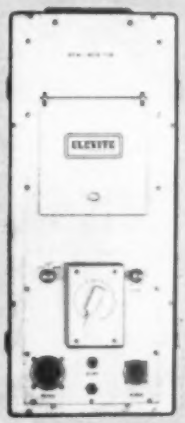


MFR-1 MAGNETIC FIELD RECORDER
28-channel, individually sprung FM or AM heads. Complete head bank is mounted on precision ways and removable without tools. Single channel may be replaced and phased in the field.

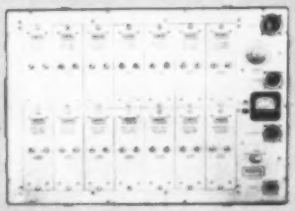
Unique belt drive system of stainless steel is servo-controlled and locked to precision fork frequency standard.



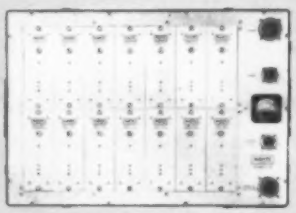
TFP-1 MOTOR DRIVE SYSTEM AND POWER UNIT (Transistorized)
Power unit contains 400 cps time standard, phase comparator, motor drive oscillator, motor drive amplifier, and auxiliary power supply.



MFM-1 MAGNETIC FIELD MONITOR
Four-inch electric writing paper with preprinted timing lines. Rectilinear electric or ink stylus.



MM-4 MAGNETIC MODULATORS
14 dual channels plus control and metering panel.



DM-2 FREQUENCY DEMODULATORS
14 channels per bank.

Import Issue May Go to Congress

Pressure is mounting for legislative action, regardless of the new controls that are expected to be ordered soon by the Eisenhower Administration.

It's almost a sure bet that the imports control issue will end up in Congress when it meets next month, regardless of what action the Administration takes on mandatory restrictions.

The revised Cabinet Committee recommendations, which may call for mandatory restrictions on imports of crude and products, reportedly were to be sent to the President soon.

Just how soon the plan will be announced was uncertain at midweek.

Presumably the revised plan, which exempts only residual fuel oil imports from mandatory restrictions, has been cleared by the Justice Dept.

It was the latter agency's objections that scuttled the committee's latest voluntary control plan just as it was going through final clearance among Cabinet officials on the committee prior to going to the White House.

But the hastily-prepared mandatory program is almost certain to face opposition from many industry groups, and from representatives of both oil-producing and oil-consuming states.

Oil state congressmen are being urged to push for effective imports controls. Some state officials, faced with declining revenues from oil production, have lost patience with the Administration's delay.

In many oil-producing areas, the fear is that the permitted volume of imports under the various voluntary programs has been too high. And the belief is that the total imports under an Administration-ordered mandatory plan would continue at a higher level than domestic producers desire.

The Texas congressional delegation, for example, is being asked to sponsor a mandatory control program that would limit imports to the "1954 ratio."

A state oil imports study commission, appointed by Gov. Price Daniel, made its report this week. Its findings are:

- Texas congressmen should support action requiring the President to establish a program "intended by Congress in its amendment to the Reciprocal Trade Act," unless a mandatory plan geared to the 1954 ratio should be set by Jan. 1.

The latter ratio was the relationship of imports to domestic production (16.6% for total imports and 10.3% for crude) used to set up the first voluntary plan.

Under the Reciprocal Trade Act amendment, industries damaged by excessive imports can seek tariff adjustment.

- A legislative subcommittee should study any "anticompetitive" practices of importing companies. The study commission reported that "excessive imports and the so-called voluntary import program have encouraged anticompetitive practices" by importers.

Any bill introduced in Congress to tighten import restrictions—by higher tariffs or quotas—is certain to meet opposition from oil-consuming state congressmen.

The expected exemption of residual fuel oil from controls under the anticipated Cabinet Committee program is due in part, at least, to pressure by consuming state representatives, particularly on the East Coast.

They also have objected to restrictions on home heating oils, arguing that limitations on the supply will result in price increases.

In fact, observers in Washington say, it is not unlikely that legislation could be introduced by consuming state congressmen to void the mandatory control program expected to be ordered before the end of the year.

Objections from eastern and northern representatives played a big part in keeping refined products exempt from the type of restrictions imposed on crude imports under the present voluntary plan.

The Administration quite likely would oppose any attempt to write tighter import controls in Congress.

It is already faced with the probability of international repercussions from a possible mandatory program, regardless of how lenient it may prove to be.

Reportedly, the plan to be adopted may include a country-of-origin system of quotas, designed to appease Western Hemisphere producing countries.

Canada has been strongly opposed to U.S. limitations on crude imports. And Venezuela, a big customer for U.S. exports, also would oppose further restrictions, even as a "favored" nation.

Finally, any mandatory imports controls program will be opposed by some industry groups. And they would certainly oppose any congressional efforts to tighten controls.

Some jobber and retail groups, for instance, have voiced strong opposition to tight controls, saying this would force prices up.

The attempt by the Cabinet Committee to write a voluntary control

Ervin E. DeGraff Is New PW Publisher

Ervin E. DeGraff has been named publisher of Petroleum Week, effective Jan. 1.

He succeeds Harry L. Waddell, who recently became Senior Vice-President, Publications Division, of McGraw-Hill Publishing Co. In this position, Mr. Waddell will have general supervision over several McGraw-Hill publications, including PETROLEUM WEEK.

Mr. DeGraff also will be publisher of National Petroleum News and Platt's Oilgram News and Price Services. He has been advertising sales manager of PETROLEUM WEEK since it began publication. He has been with McGraw-Hill Publishing Co. in various capacities since 1941, with time out for service in the U.S. Navy during World War II.

plan that would be satisfactory to most industry groups as well as to several government departments is the underlying reason why the voluntary program which had been under study since last September ran into trouble.

The basis for the objections raised by the Justice Dept., which apparently killed the new attempt at voluntary controls, reportedly was the large share (60%) of the total permissible imports to be allocated to "historical" importers.

The view was that such an allocation would "freeze" present market positions, and would be in violation of Section 1 of the Sherman Anti-trust Act.

January Crude Output Will Rise

Domestic crude production in January is likely to average close to 7.2-million b/d, the highest since May, 1957.

That's the present indication, based on state allowables already set and the anticipated action in other states.

Purchasers generally have indicated they desire only slightly more crude next month than they nominated to buy in December.

Also, the Bureau of Mines' forecast of market demand for domestic crude shows no substantial change in the major producing states from its estimate for December.

The Texas Railroad Commission decided this week to continue the current 12-day producing pattern into January leaving the basic allowable unchanged.

The state's permissible production as of last Saturday averaged 3,128,366 b/d, a figure which will be increased by the start of the year, due to new production.

In the other states, too, new production coming in during late December and January will boost the January allowables—and actual production—to a level about 100,000 b/d over the probable December average.

In Texas, Humble Oil & Refining Co., the state's largest crude buyer, recommended a continuation of the December schedule for next month.

Louisiana expects to continue its December permissible into January.

Conservation Commissioner Ashton Mouton said the present 848,000 b/d allowable probably would be continued.

The requested cut is due to a reduction by Indiana Oil Purchasing Co. following shutdown of American Oil's Destrahan (La.) refinery.

Steam Wells Supply Fuel

Steam from the earth may soon be used in California to drive the turbine engines of a power plant.

A plant to utilize the earth's natural steam for power production is being planned by Pacific Gas & Electric Co.

The company has asked the California Public Utilities Commission for permission to build the geothermal steam-electric generating plant at The Geysers, Sonoma County, Calif.

The turbine of a 12,500-kw. plant will be driven by steam, from steam wells that have already been drilled. PG&E has an agreement with Magma Power Co. and Thermal Power Co. for those firms to deliver the steam.

The companies hold leases on The Geysers property on Big Sulphur Creek, 26 mi. northeast of Healdsburg.

The contract between the utility firm and the steam-producing companies is contingent upon approval of the project by the state commission.

If it gets state approval, PG&E hopes to start construction next July, and to have the plant in operation in April, 1960.

PG&E expects to invest about $2-million in the plant and related transmission facilities.

Terms of the contract call for a second turbine generator unit at the same location when additional steam is made available by the supplying firms. Eventually, other units may be added.

The plant will be the first of its type in North America, the company says.

It is also said to be the world's first privately-financed geothermal plant. Government-subsidized stations using natural steam are operating in Italy and New Zealand.

The first of the steam wells involved was drilled in 1955. It was done by Thermal Power Co., using a rotary rig.

The well almost had a blowout when the drill bored into the high-pressure steam pocket. Pressure was estimated as high as 1,200 psi.

Since such wells are rare in this country, operating information was obtained from Italy.

Geologists consider that the steam pockets had their origin in volcanos, explaining that after the molten mass erupted, it then "percolated" back through the heated layers of rock. This turned the moisture into steam.

O'Leary, Homco President, Dies

George O'Leary, president of Houston Oil Field Material Co., Inc., since 1936, died in Houston, Dec. 12. He was 65.

Hugh Q. Buck, Homco's general counsel for 17 years, has been appointed acting president until a permanent president is selected.

O'Leary started with Homco in 1929 as a salesman. Two years later he became director of sales, and in 1932 he was promoted to vice-president in charge of sales. Four years later, he was elected president.

Last September, a substantial block of Homco stock was purchased by Frederick W. Richmond, a New York industrialist. Richmond became board chairman, but O'Leary remained the active head of the firm.

Before joining Homco, O'Leary had worked for various oil field supply firms.

O'Leary was active in oil organizations. He was a member of the American Petroleum Institute, Independent Petroleum Assn. of America,

NOMADS, American Assn. of Oilwell Drilling Contractors, Texas Mid-Continent Oil & Gas Assn., and Texas Independent Producers & Royalty Owners Assn.

One '59 View: Oil Will Gain

The oil industry can look to 1959 with cautious optimism, partly because of the reduction in stocks during 1958, an industry leader says.

L. F. McCollum, president of Continental Oil Co., makes this observation in a "year-end" statement:

"On the basis of preliminary figures, it appears that inventory liquidation in 1958 will average about 120,000 b/d—the largest stock draw-down in any year since World War II.

"In fact, during 1958, a year of recession, the reduction in inventories has been twice as great as in 1950, the year this country mobilized for the Korean conflict.

He considers this "quite a record of successful inventory management against great odds."

McCollum points out that stocks of crude oil and refined products were 62-billion bbl. last January—8% above the 1957 level—but had dropped to 35-million bbl. by the end of November. This was 4% below the 1957 figure.

Because domestic demand increased only slightly more than 1% during the first nine months of 1958, the stock reduction was achieved by curtailing production and refinery runs, McCollum notes.

The 1959 outlook is further brightened by the possibility that domestic demand may rise 4% or 5% over 1958, McCollum says. He figures this may permit a 7% increase in domestic crude production and a refinery-run boost of about 5% or 6%.

He feels, however, that this gain would have to be "aided by continuing improvement in general business conditions." Such an increase in demand would help restore product prices to more satisfactory levels—"providing that the industry continues to exercise common sense with regard to inventory management."

The industry's biggest problem is "halting the persistent rise in oil-finding and developing costs," McCollum believes. These costs have been increasing about 8% a year, he observes.

Because of surplus foreign oil and surplus domestic productive capacity, plus the increased competition from natural gas, the danger of further crude price cuts persists, he says.

That makes cost reduction highly necessary if the domestic producing industry's profit margins are to be held at adequate levels, he reasons.

PETROLEUM COMMENTS

By Wanda M. Jablonski

Not Just Bones; Red Meat, Too

Oil companies interested in new Middle East concessions might do well to keep a close eye on Iraq.

For it looks as if some really first-class prospective oil acreage will be given up by Iraq Petroleum Co., in a move unique in the annals of concession operations.

* * * *

Negotiations on the Iraq Government's request for some relinquishment were resumed in Baghdad last week by G. H. Herridge, managing director of IPC (which holds concessions for all Iraq except the tiny Khanaqin area).

IPC's initial offer, a month ago, was to give up 20% of its acreage immediately, 20% of the rest in five years, and another 20% in ten years (for a total of 48.8%). Baghdad countered with a request for an immediate 50% relinquishment, plus 20% in five years, and all the rest not needed by IPC in ten years.

Now Herridge has returned with an increased IPC offer: 50% relinquishment, with 25% immediately and the rest in several years.

* * * *

While the Baghdad talks have focused primarily on the size of the relinquishment, the really significant aspect is the quality of the lands IPC is offering.

IPC has included four areas in the 25% share it is prepared to yield immediately:

(1) A wide west-east band across the middle of Iraq, from the Jordanian and Syrian border, through Baghdad, to near the Iranian border.

(2) The offshore Persian Gulf.

(3) A strip in the Kurdish mountains adjoining Turkey and Iran.

(4) The Iraq-Saudi Arab "Neutral Zone" (not to be confused with the Kuwait-Saudi zone).

The last two are minor. The offshore tract, however, is of great interest, since it adjoins the new Iranian offshore concessions, and lies close to the big onshore oilfields at Basrah and Kuwait.

But most interesting—and most surprising—is the offer of the wide slice across the middle of Iraq from west to east. This presents a cross-section of all the main geological prospects of Iraq, from the poorest in the western end to the choicest in the eastern part.

The huge oil-bearing structures of Iraq run pretty much in a straight band from northwest Iraq to the southeast at the Persian Gulf. In its northern sector, IPC struck the huge Kirkuk oil fields. In the southern sector, it hit the great Basrah fields. With all this wealth of oil, IPC never got around to drilling the middle sector—but geologists consider it has "first class" oil prospects.

And the new west-east band that IPC is offering cuts right across this choice middle sector.

* * * *

Offhand, oil men might assume that IPC should have its head examined. Nobody—but nobody—in his right mind in the oil business ever voluntarily relinquishes any but the least promising areas of his concession.

But there is method in IPC's "madness"—indicating an enlightened degree of appreciation of the need for flexibility in the Middle East, and the need for changing with the times.

For some time, Iraq has been eyeing with envy the huge cash bonuses and other higher terms being offered for new concessions in neighboring areas. But it hasn't been able to cash in on this trend for lack of acreage to offer—and IPC's concessions do not carry relinquishment obligations.

Taking a hard look at the realities of the situation, IPC's owners (Shell, British Petroleum, Jersey Standard, Socony, and Compagnie Francaise) decided it would be sound long-term policy to give up some acreage voluntarily.

Yet what good would it do to return just unpromising tracts—throw back "only the bones"—on which Iraq would fail to get good bids?

The quality of the acreage now offered makes it clear that IPC is really cooperating with Baghdad—not just giving it lip-service.

With aerial surveys . . .

Changes in 'Pitch' Aid Oil Search

Less costly and faster aerial exploration of remote and featureless areas may now be done using a navigation system that requires no ground stations.

The aerial navigation system, which was first developed for military use, is a radar technique that employs the Doppler principle of changing frequency of sound, or "pitch," between two objects that are in motion relative to each other.

Doppler is used in aerial navigation to determine ground speed and drift angle.

The first exploration use of the new system was to guide an airborne magnetometer survey of the central Sahara desert in southern Libya, by Aero Service Corp. for Pan American International Oil Co.

The survey for the Standard Oil Co. (Ind.) affiliate, is now being completed, with magnetic data being compiled in Aero's Philadelphia office. It covers 40,000 sq. mi. of an area that lacked recognizable surface features. This normally would have required the cost and time of establishing ground stations to guide survey pilots on predetermined parallel lines, or courses.

Aero Service estimates that the use of Doppler navigation reduces over-all survey costs by 50% or more, and cuts survey time by 40%, as compared with conventional ground-guided surveys.

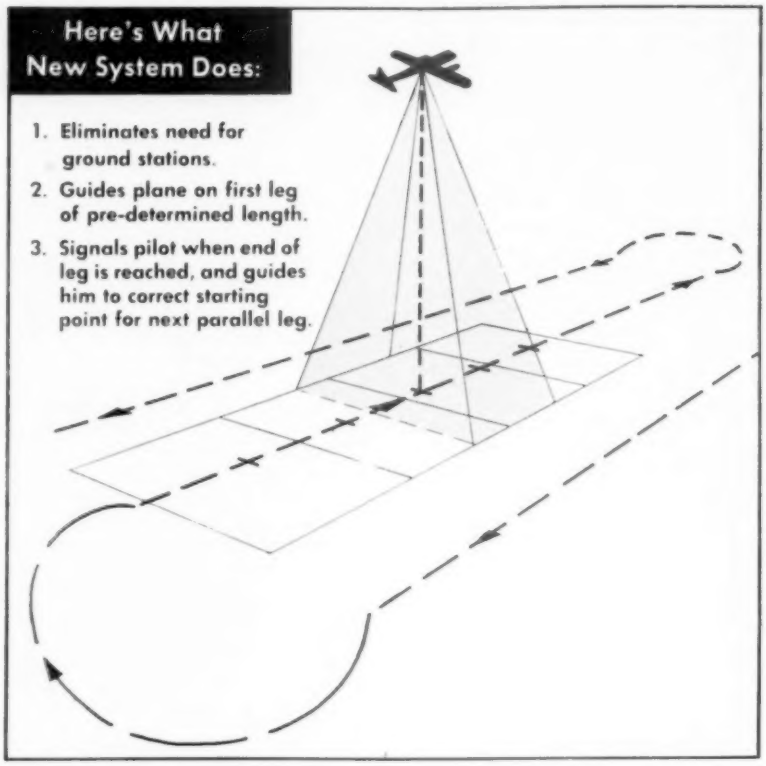
The Doppler-type guidance costs between $1 and $2 per "line mile" flown, compared with costs ranging from $10 to $20 a line mile for conventionally guided surveys, the company says.

Aero Service is now preparing to start another such survey, covering 15,000 sq. mi. in southwestern Morocco in the Spanish Sahara, according to Homer Jensen, chief of its airborne geophysical division.

The new survey, to be done for Italy's Azienda General Italiana Petroli, will be over an area that is largely unmapped and unphotographed.

Since the magnetic data is required at a very early stage in Azienda's exploration program, the use of the new navigation guidance permits making a magnetic study prior to, or simultaneous with, an aerial mapping program, Jensen notes.

Using the new navigational system, surveys can be made over any type of terrain without the aid of maps or aerial photographs, according to Aero.


Here's What New System Does:
1. Eliminates need for ground stations.
2. Guides plane on first leg of pre-determined length.
3. Signals pilot when end of leg is reached, and guides him to correct starting point for next parallel leg.

The particular system used by Aero is called "Radan." It was designed by General Precision Laboratory, Inc.

In the system, four columns, or "pencils," of radiation are directed downward from the aircraft. Two are transmitted fore and two aft to create an X-shaped pattern on the ground.

The frequency-shifts from the two diagonal pairs of pencils are compared.

When measuring for drift, differences in frequency actuate a servomechanism, which rotates the system's antenna so that its axis is aligned with the path of the aircraft, and the frequency difference is reduced to zero.

Comparing the angle of the antenna array and the center line of the aircraft gives a direct reading of drift within 1/10th of one degree, according to Aero geophysicists.

The sum of the drift angle and the airplane's compass heading shows the track angle flown.

When measuring ground speed, signals from the forward pencils are compared with those from the rear pair.

The frequency shift between the two pairs are converted into a direct indication of ground speed, usually accurate to 1 part in 1,000, or better, says Aero.

Roughness of terrain causes no errors in the Doppler signal. Frequency shifts alone, not the distance to the ground, affect the readings of the device.

So far, only ocean areas have provided problems in using Doppler navigation in aerial survey work. Surveys over moving water have proved to be less accurate than those over ground or fixed ice.

A special precision computer is used with the system to guide survey airplanes along a predetermined straight line on the earth's surface.

Prior to flying a survey, a desired track angle, or course, is set into the computer. That is compared constantly by the computer with the actual track angle flown.

In flying a grid of parallel lines, the normal pattern in aerial surveys, the computer signals the end of each flight line.

Then it provides guidance to the pilot for executing a turn onto the next parallel line, offset from the first by a pre-set distance.

What's New / IN THE INDUSTRY

How much interest is there in the possible use of atomic energy to develop oil shale? The government expects to find out at a meeting in Dallas Jan. 6-7 to which it has invited interested firms, including more than 20 oil companies. Officials of the Atomic Energy Commission and the Bureau of Mines, sponsors of the meeting, say they plan to outline present knowledge of atomic usage and to tell of future possibilities.

•

State lands in Alaska will be offered for leasing on a competitive bid basis, except those on "known petroleum structures." Leasing regulations under the Alaska Land Act of 1957 are required to conform as closely as possible with terms of the federal land rules, according to Phil R. Holdsworth, Commissioner of Mines and chairman of the newly formed Land Board. The state policy limits any company or individual to leases on 100,000 acres and options on 200,000 acres.

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The Treasury Dept. says any possible change in percentage depletion requires "careful consideration." It made this comment, without defining its views, in reply to a letter from Paul Hadlick, general counsel for the National Oil Marketers Assn. Hadlick had asked the department to "take a positive position . . . in favor of a reduction or elimination of the 27.5% provision."

•

OCAW has been offered a 4% wage hike—but it was from a chemical firm, not an oil company. A union official said the offer was made by Petro-Tex Chemical Corp., of Houston. Subsequently, the union rejected the offer. An oil company labor expert sees no likelihood that this offer will make the start for a wage-hike pattern among oil companies. He thinks oil firms will "stand pat" despite strike votes being taken by many OCAW locals.

•

A California firm is increasing its imports of Canadian crude. Starting Jan. 1, General Petroleum Corp. will import 23,900 b/d for its Ferndale refinery. It has been taking 11,500 b/d.

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Russia wants to sell Canada 1-million tons of oil in exchange for continuation of Russian purchases of Canadian wheat. Apparently realizing that the Canadians don't need the oil, the Russians pointed out that they don't really need Canadian wheat, either.

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U. S. shippers operating under "flags of convenience" may face continuing attacks from unions. Indications are that the unions' strategy will be to follow their recent broad boycott with boycotts against individual shipping firms. However, a group of operators have asked a New York court for an injunction against future boycotts. An earlier appeal, made on the eve of the Dec. 1-5 boycott, was turned down.

•

Louisiana has resumed offering offshore tracts. The State Mineral Board is taking applications on Zone 1 tracts until Dec. 31. Bids will be opened Feb. 19.

INSIDE *Slant*

ENGINEERING PAYS OFF

Are company reservoir engineering schools profitable?

Decidedly so, says a recent issue of Humble Way, house publication of Humble Oil & Refining Co.

Forty petroleum engineers and scientists were members of the 13th graduating class of the 12-month course, which is designed to help engineers learn how to get more oil out of the ground, and to do it more efficiently.

The young engineers, most of them new employees and recent college graduates, are reassigned to various field positions, where they put into practical use the reservoir engineering knowledge they acquired in the training course.

Humble finds, in its operations, outstanding examples of how engineers are using their knowledge to increase recovery from new and old reservoirs.

Humble now has reservoir engineering projects in operation or ready to go into operation in 147 reservoirs, which will yield an estimated 204-million bbl. of additional oil.

Other projects for 50 reservoirs are being studied, which might result in additional recovery of 244-million bbl.

Quite profitable, isn't it?

Leroy Menzing
EDITOR

Looking Ahead in Washington

McGraw-Hill
Washington
Bureau
December 19, 1958

The Memphis decision revives some hopes for a natural gas bill. Last week's ruling by the U.S. Supreme Court—favorable to gas pipelines—has caused some industry and political figures to take another look at chances for a gas bill in 1959. So far, the chances still look slim, but the bill may be given a bigger push than was earlier expected.

The court action makes clarifying legislation on pipeline gas rates unnecessary. Had the court ruled otherwise, there would have been a major effort in Congress to tighten the rate language of the Natural Gas Act. Subsequently, plans for another gas bill would have got little attention.

Another reaction to the Supreme Court ruling is that industry leaders see the decision as essentially "conservative"—and hope that the court's "business reality" approach will gain wider application.

Plans now are being talked for introduction of a new gas bill next year. Potential sponsors are being lined up, and proposals are being drafted. There is some speculation that President Eisenhower might again plug for a gas bill in his early messages to Congress. But there is still an overriding feeling that any attempt to pass a bill will be a long, uphill fight.

•

Washington sees the Venezuelan political situation as moderate. The election of Romulo Betancourt as president undoubtedly will have its effects on U.S. oil investments in Venezuela (page 44). Betancourt campaigned on a platform for formation of a national oil company, for a bigger share of oil profits from foreign investments, etc. But diplomatic experts believe Betancourt will move slowly toward these goals, and that U.S. investment may fare better under a promised new stability than it has in recent years.

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The Federal Power Commission's temporary-certificate procedure is under fire from coal interests. The National Coal Assn. has written the House subcommittee on legislative oversight, complaining that FPC abuses its discretion in issuing temporary permits for natural gas pipeline construction. The coal group argues that many emergencies are created by the pipeline companies themselves. The House subcommittee, which has taken only a brief look at FPC operations so far, may renew its check next year.

•

More litigation may be in store for the government's oil imports program. The suit by Eastern States Petroleum & Chemical Corp. against the current voluntary program is still a live issue. Attorneys for both Eastern States and the government are believed to be awaiting action on a new imports program before going to trial on their case. Legal questions have again arisen on the President's authority, under the trade act, to impose mandatory import controls. Some lawyers believe a court test of that authority—which they think too vast and sweeping—might throw the situation into a further dilemma.

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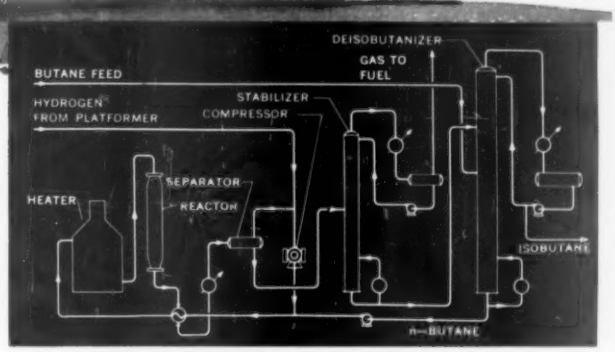
Another minimum-wage fight will start in Congress next month. While the Administration is expected to oppose an increase from $1 to $1.25 an hour, there may be support for extending the current wage minimum to cover retail trade—including service station employees.

BUTAMER*



A new and practical process for producing isobutane

Increasing use of alkylate for blending into motor fuels gives the new Butamer process an important responsibility in supplying the much needed isobutane for alkylation plants. Butamer is a technique that provides a profitable means for isomerization of normal butane, especially as feed for alkylation processes—with which it is readily and economically integrated.

Butamer, as a key process in supplying feed for alkylation, plays an important part in refiners' move to produce a greater volume of isoparaffinic motor fuel. The need for isoparaffinic constituents, such as alkylate, in gasoline blends has been brought sharply into focus by increasing difficulty with surface ignition and its consequent "rumble."

Heart of the Butamer process is a stable and rugged platinum-containing catalyst especially developed by UOP. Capable of operating at relatively low temperatures, its use assures a sufficiently high concentration of isobutane in the reactor effluent to eliminate excessive recycle of normal butane.

Operating under hydrogen pressure, with low hydrogen-to-charge ratio, the high catalyst activity results in economical liquid hourly space velocities, thus requiring only a modest catalyst inventory. The mild operating conditions further assure minimum loss to by-products.

Butamer is one of many UOP refining and petrochemical processes made available to all refiners. A brochure describing these processes and how you may profit by their use is yours for the asking.

*Trademark

UNIVERSAL OIL PRODUCTS COMPANY

30 Algonquin Road, Des Plaines, Illinois, U.S.A.

More Than Forty Years Of Leadership In Petroleum Refining Technology

Hefty Deep Play in South Mississippi

South Mississippi has become one of the more successful and interesting oil exploration areas in the country.

Developments in some half-dozen counties this year have brought a new surge of optimism to the state's oil industry.

A check of some figures quickly shows why. In 1957, a total of 389 tests were drilled in the state, of which 258 were dry.

Up to December of this year, 357 holes had been drilled, of which only 188 were dry. Of the producers, 148 are oil wells and 21 are gas wells. It's expected that the total number of tests drilled this year will be around 400.

Mississippi wound up with 10 oil field discoveries in 1957. As of last month, 11 new oil fields had already been found this year.

The success ratio in 1958 is considered almost sensational when compared with the state's history of 15 dry holes for every producer among wildcats and one dry hole out of every four development holes.

The bright outlook is largely due to recent successes in the deep Lower Cretaceous and to a revival of the Lower Tuscaloosa of the Upper Cretaceous.

Most of these discoveries have ranged in depth from 10,000 ft. to about 14,000 ft.

The deep-pay hunt began in earnest last year with discovery of several fields producing from 9,000 ft. to below 12,400 ft. (PW—Jul.4'58,p18).

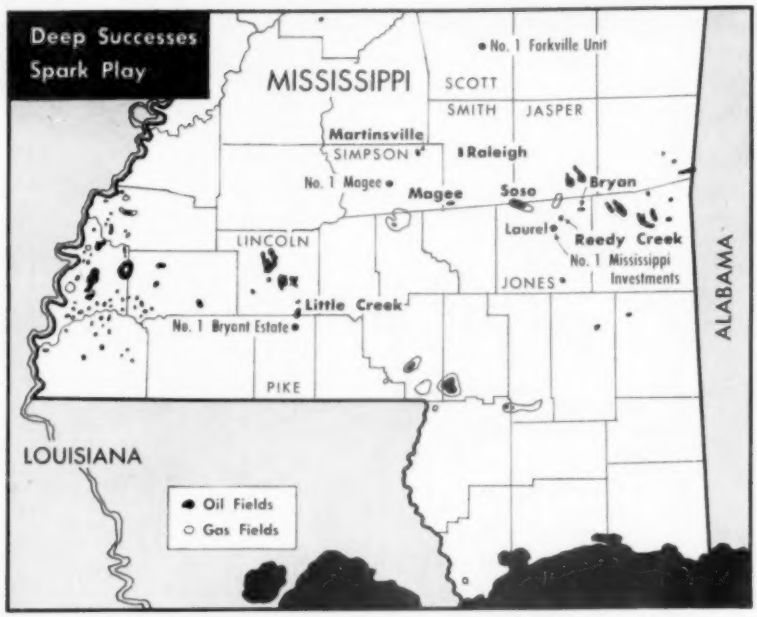
Despite the difficulty and expense of such deep drilling, operators have been encouraged by the many successes to accelerate their efforts, as the figures show.

Little Creek field, in Pike and Lincoln Counties, continues to hold top billing in the current show of activity. It produces from the Upper Cretaceous.

Little Creek is the hottest new oil field in the state, and one of the hottest in the country. There are 12 rigs working in the field presently, with another three being used to drill nearby wildcats.

The field was discovered in late January this year, and 41 producers had been completed by early December. Production is from the Lower Tuscaloosa.

Early in December, the field received an important apparent extension 2 mi. southward with completion of George Harrison and D. A. Biglane No. 1 Bryant Estate, section 14-4n-8e, Pike County.



NEW FIELDS and important wildcats indicate scope of deep play in South Mississippi.

This well was completed for 360 b/d through 11/64-in. choke and perforations at 10,746-78 ft. in the Lower Tuscaloosa. The pay, however, was found 15 ft. to 16 ft. higher than it has run in the southernmost producers in the field.

The Harrison-Biglane completion has touched off another lease boom in northern Pike County.

There has been successful Lower Cretaceous activity in Jones County, to the east.

Reedy Creek field was discovered in July, when Larco Drilling Co. No. 1 Whittington was completed in the Mooringsport at 11,012-28 ft.

Bryan field, 2 mi. east of Sandersville field, was discovered in September by Central Oil Co. and Lone Star Producing Co. No. 1 Masonite Corp., section 25-10n-10w. The discovery was completed for 304 b/d through perforations in the Lower Glenrose at 10,710-22 ft.

Confirmations are being drilled to both discoveries.

Within the western city limits of Laurel, Central Oil Co. and Zach Brooks Drilling Co. No. 1 Mississippi Investments has been tested for production in the Lower Tuscaloosa. The prospect, which was carried to 12,308 ft., also has several promising oil sands in the Lower Cretaceous.

Gulf Oil Corp. has spudded a test a mile north of the Laurel venture.

Smith County also has had its share of the deep play.

Magee field was discovered in July by Arkansas Fuel Oil Corp. No. 1 Womack, section 35-1n-6e. It was completed for 250 b/d of 43-gravity oil through perforations in the Sligo sand at 13,045-54 ft.

AFO had one dry hole in an attempt to offset to the southeast, but a southwest offset is an indicated success.

The nearby Martinville and Raleigh fields, both Lower Cretaceous discoveries last year, are being developed into multizone fields, with producing horizons in the Hosston, Mooringsport, and Sligo.

Raleigh field now has 13 deep producers, and Martinville 7. Field limits have yet to be determined.

Soso field, straddling the corner of Jones, Jasper, and Smith Counties, now has more than 95 wells in the deep zones of the Lower Cretaceous. This is the field that set off the deep drilling boom in Mississippi three years ago.

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focused on a test in nonproducing Scott County.

The test—The California Co. No. 1 Forkville Unit, section 32-7n-7e, recovered 5 bbl. of 41-gravity oil on 1¼-hour test of the Smackover at 13,498 ft.

James Borthwick, state Oil & Gas Board engineer, says the Forkville Unit is the first recovery of high-grade oil in the Smackover east of the Mississippi River. Completion in the Smackover could touch off a big new play. A hunt for the Smackover pay has been under way in the state for a dozen years or so. Up to now, however, the elusive horizon has given up only poison gas.

At last report, Calco was setting pipe and coring ahead at 13,696 ft.

Another wildcat, in Simpson County, also has drawn keen interest.

Jett Drilling Co. No. 1 Magee, section 17-1n-4e, 3 mi. southwest of Mendenhall, has encountered numerous shows in the Paluxy around 11,700 ft. The test is projected to 14,500 ft. to test the Hosston.

Many oil men in the state say Mississippi's system of permitting production up to the most efficient rate is a key factor in the stepped-up play.

The state Oil & Gas Board policy has been not to restrict deep production, below 10,000 ft., until bottom-hole pressure becomes adversely affected.

In Little Creek field, for example, an allowable of 200 b/d per well has been fixed, much to the satisfaction of operators, though a majority of the wells are capable of producing 500 b/d or more.

It is a matter of record that during 1948, the last year of production before allowables were fixed by the state board, Mississippi produced 45,665,350 bbl. of oil, a figure that hasn't been matched since. Production last year totaled 38,939,362 bbl.

For practical reasons, however, production is limited by market demand.

Drilling May Solve Minden Dome Puzzle

A two-pronged drilling attack, now in the planning stage, may unravel the tangled geology of Louisiana's Minden salt dome.

Pan American Petroleum Corp. plans to launch the first phase by circling the dome with tests, with any further drilling hinging on the outcome of each venture.

The second phase would involve drilling offsets to each producer, thus expanding the band of production on the dome flanks.

Pan American, discoverer of the field and major leaseholder off the flanks of the dome, is the only operator in the field with production. The company has about 5,000 acres in the Minden area, which is located in Webster Parish, northwest Louisiana.

Since May, 1957, the company has drilled six holes—three producers, three dusters. But it still has some unanswered questions about the unique Paluxy sand reservoir—the pay zone.

The No. 1 question—apparently answerable only by continued drilling: Why do wells on the dome's west flank produce oil and those on the east produce gas-distillate?

On the east flank of the dome, Pan Am's No. 1 Anna A. Hudson, section 21-19n-8w, first discovery in the field, was completed in late May, 1957, for an open flow potential of 9-million cf/d of gas, plus 13 bbl. of 58-gravity distillate per million, through perforations at 7,460-66 ft. in the Paluxy.

Moving to the west flank of the dome, Pan Am then drilled No. 1 Effie McDow Lee, section 19-19n-8w, completing it as the oil pay opener in late March, 1958.

The well, about 1½ mi. southwest of the east flank well, was dually completed to flow 121 b/d of 24-gravity

oil and 24,000 cf/d of gas through perforations in the upper Paluxy at 6,948-55 ft., and 228 b/d of 29-gravity oil and 125,000 cf/d of gas through perforations in the lower Paluxy at 7,386-94 ft.

Pan Am's third and latest producer is No. 1 Youngblood, section 21-19n-8w, about ½ mi. southeast of the gas discovery—on the east side of the dome.

The well was completed for 45-million cf/d of gas, plus 11 bbl. of distillate per million, through perforations at 7,502-10 ft. in the Paluxy.

A pipeline to these two eastside producers is expected to be completed soon, and the wells will then be put into production.

Only production to date has been during testing, plus some gas sold to a drilling contractor for rig use.

Further complexity of the Minden dome's geology is illustrated by the three dry holes drilled to date.

Two of the tests were drilled on the east side. One, 300 ft. west of the discovery, was abandoned after being carried 3,433 ft. into the salt. No tests were made.

The second eastside dry hole was drilled only 120 ft. west of the discovery. It was abandoned in the Paluxy after being drilled to 6,530 ft. It tested noncommercial shows in the Upper Cretaceous.

The third dry hole was on the west side of the dome—a south offset to the west flank oil producer. It was abandoned after drilling was carried to 9,193 ft. The Paluxy sand was not found.

Faulting probably is the key to the difference in the east-west production, and perhaps to the other questions, too.

Up to now, there hasn't been enough drilling to provide adequate subsurface information.

Other factors being mulled over by Pan Am geologists are:

- Almost continuous shows of oil and gas—more than 1,000 ft. of shows in the eastside field opener—from the Nacatoch sand through the Smackover lime, most of them being nonproductive tight sands and lime.
- A unique salt core from one of the dry holes. The sample is split vertically down the middle, with oil on one side and pure salt on the other.
- Complete absence of the Paluxy pay section in the south offset to the oil pay opener on the west flank of the dome.

Pan Am had planned to deepen its salt dry hole, in an effort to determine whether there is an overhang or mushroom top on the dome. Mechanical difficulties, however, prevented further drilling.

Future plans call for reviving such an approach, should another test encounter similar conditions.

Continue Texas Fireflood

Southworth & Wood is making a second try at its Anderson County (Tex.) thermal recovery program, with a new plan for controlling the fire front.

The initial fireflood attempt (PW —Jul.18'58,p22) provided a considerable amount of information, and was successful to a limited extent. But it failed to achieve the hoped-for results.

Production reached only 15 b/d on a sustained basis.

A thermal front was achieved (in fact, the fire is still burning), but the fire did not burn in an even, solid front.

Apparently, the front "fingered" out along stringers instead of proceeding out in a bank.

Strict control of the fire's direction and rate of movement—to achieve a symmetrical front—will be stressed in the new program.

The consulting firm, Tejas Petroleum Engineers, Dallas, headed by Jon T. Moss and Dr. Phillip White, is in charge of the program.

The primary means of controlling the movement of the burning front will be through control of the air supply to the burning zone.

In this manner, White says, it is possible to regulate the rate of burning-front advance to the desired schedule.

"But the direction of movement of the front," he added, "can be controlled only by an analysis of the combustion gases being produced from each quadrant in the pattern.

"This control is obtained by back-pressuring a production well in a quadrant where the burning front is moving too fast, and lowering the back-pressure on production wells where the front is moving too slowly. In this manner, a symmetrical front is maintained insofar as possible."

To achieve this control, it is necessary that a large percentage of the combustion gases be produced and metered from the pattern production wells.

This produced gas is then analyzed for its carbon dioxide, carbon monoxide, oxygen, and nitrogen content.

"The quantity and composition of the produced gas," White says, "is then converted into the amount of fuel burned to produce the combustion gas, by stoichiometric relations developed from laboratory combustion tube studies, using material from the reservoir under study.

"This, in turn, is related to the amount of reservoir volume burned, using information gained from the combustion tube study. The results of the study allow interpretation of the burning conditions in the formation during the test, and point out deviations from the predicted behavior in time for corrective steps to be taken."

A five-spot pattern is being prepared for the new thermal program —scheduled for ignition about Jan. 1.

Southworth & Wood is now drilling the third of four wells for the program. One well from the previous attempt will be used as the fifth well.

The air compressor system and much of the above-ground equipment installed for the first program will be used in the second effort.

The old assembly to superheat the air going into the inspection well, however, will not be used.

New equipment for the program includes such items as heater-treaters and water knockouts. The flood will be ignited by means of a bottom-hole electric igniter.

The operator says the equipment required for the program will be considerably less expensive than that used in the first attempt.

The MODERN way to make-up sucker rods

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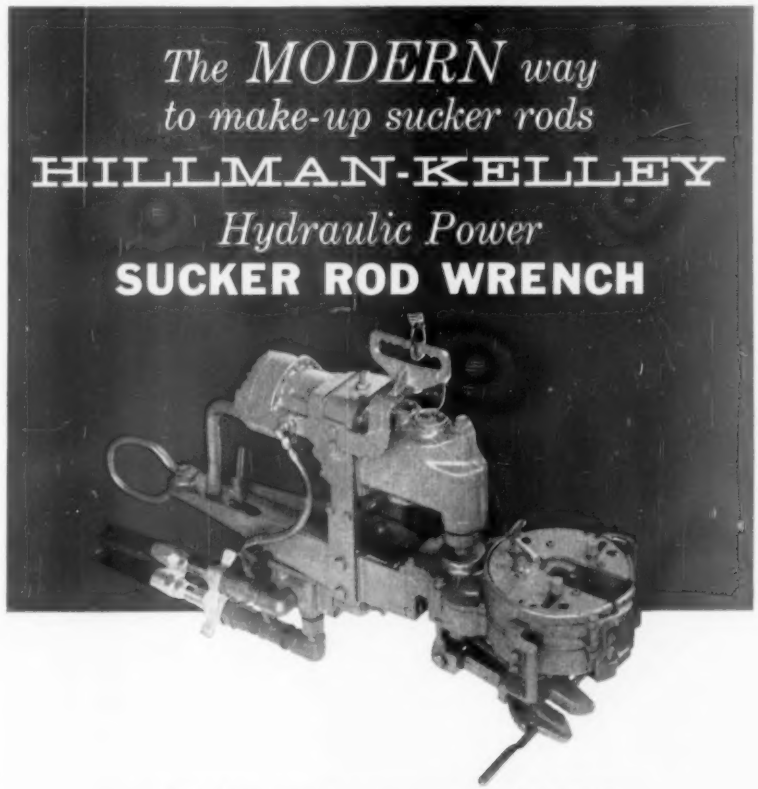

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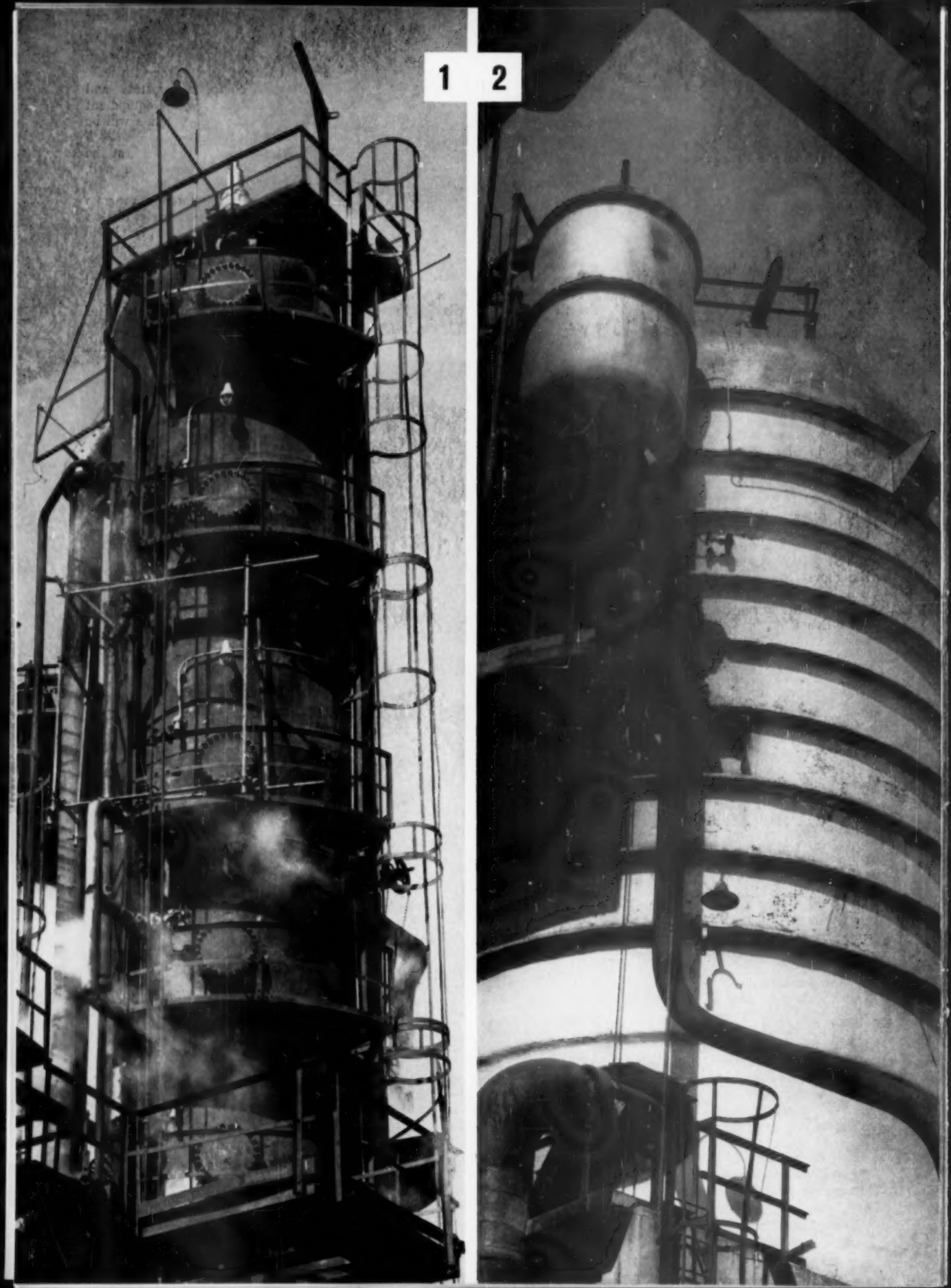
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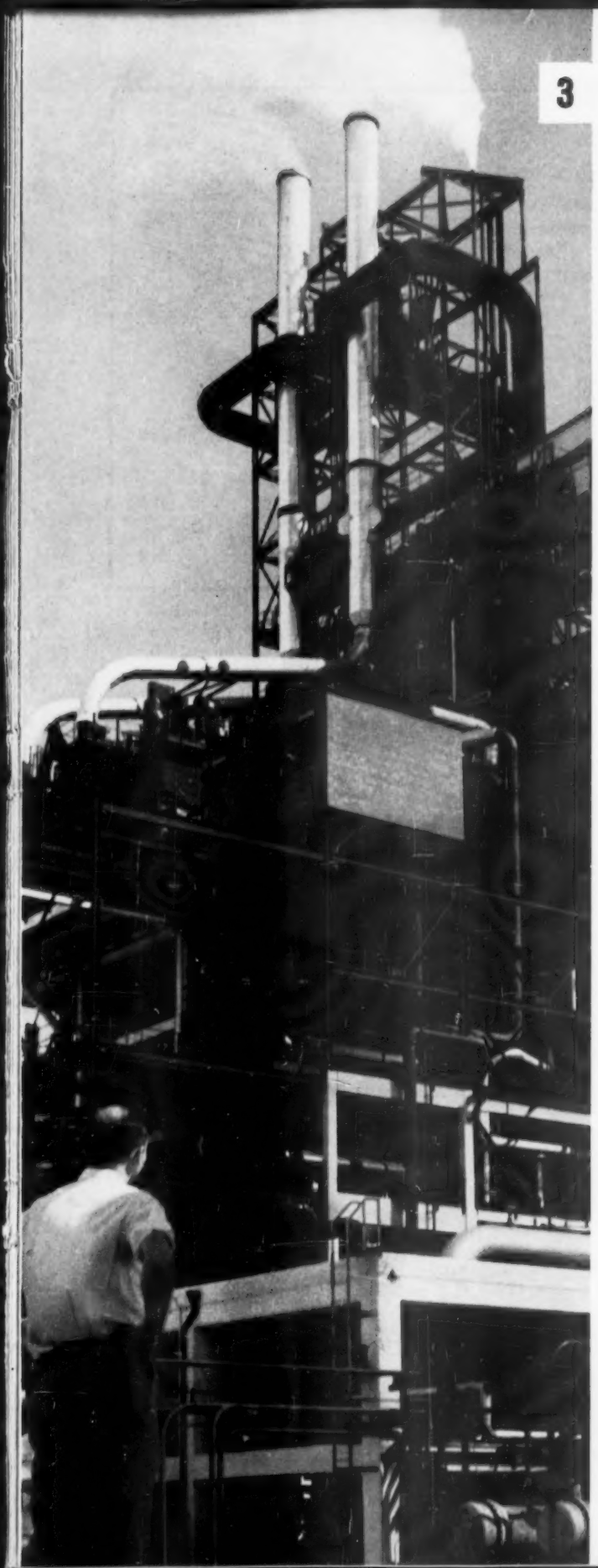

3

Stainless Steel wins three more battles with corrosion

1 High temperature sulfur corrosion from sour crude destroyed every metal tower in this plant. As the failures occurred, all towers were replaced with Stainless Steel lined equipment. Not one lining has failed since, and some of them have been in service continuously for eight years.

2 Two vacuum evaporators at this plant remove gas oils and asphalt from reduced crude at operating temperatures of 740° F. The evaporators were unlined at first, and inspection showed that they were failing rapidly from high temperature sulfur corrosion, coupled with severe erosion caused by the crude which entered the evaporators under pressure. The evaporators were promptly lined with Stainless Steel sheets, and, in five years of service, the sheets showed practically no wear. Plant engineers say they will be good for five to ten more years.

3 When they switched from sweet crude to sour crude in this "cat" cracker, the lower section of the fractionating tower corroded and had to be shut down for major repairs. The tower was repaired by installing Stainless Steel in all corroded areas. After three years of operation, the Stainless Steel was still in excellent condition.

When you consider all the materials that go into a refinery or petrochemical plant, very few will show such dramatic results as Stainless Steel. No other metal has such a desirable combination of corrosion resistance, surface density and smoothness, strength (even at high temperatures) and ease of fabrication. Build and repair with Stainless Steel. And for service-tested quality, specify USS Stainless Steel. USS Stainless Steel is available through your USS representative or your local steel service center.

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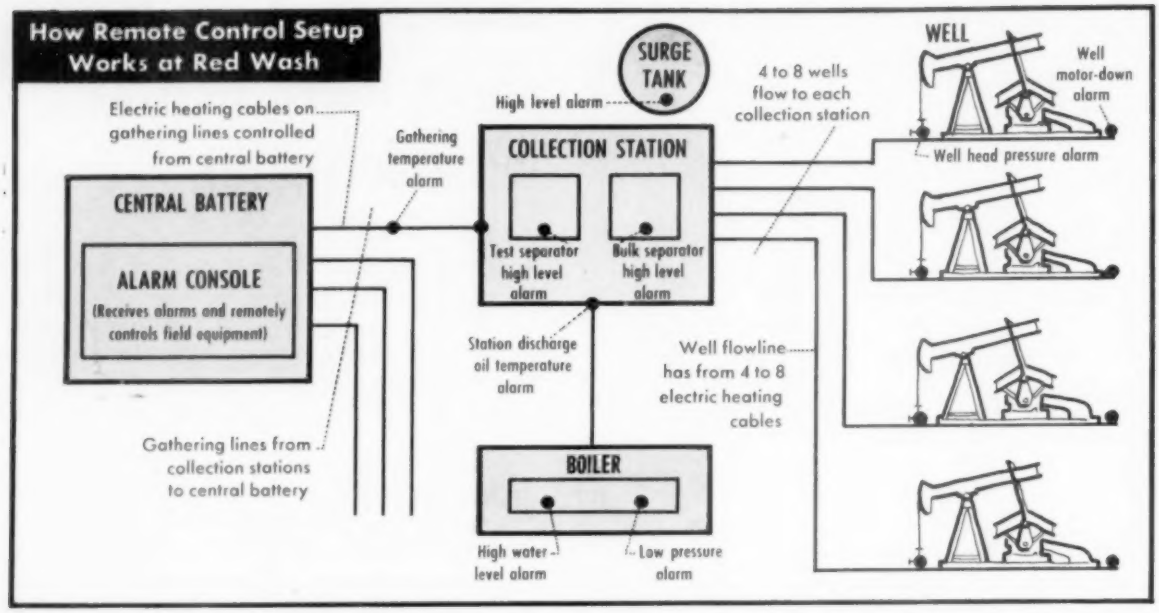

How Remote Control Setup Works at Red Wash
Electric heating cables on gathering lines controlled from central battery
CENTRAL BATTERY
ALARM CONSOLE
(Receives alarms and remotely controls field equipment)
Gathering lines from collection stations to central battery
Gathering temperature alarm
SURGE TANK
High level alarm
COLLECTION STATION
Test separator high level alarm
Bulk separator high level alarm
Station discharge oil temperature alarm
BOILER
High water level alarm
Low pressure alarm
4 to 8 wells flow to each collection station
WELL
Well motor-down alarm
Well head pressure alarm
Well flowline has from 4 to 8 electric heating cables

SCHEMATIC SETUP of electronic control system installed by Standard Oil Co. of California at Red Wash shows how . . .

Electronics 'Operates' Utah Field

A unique electronic control system for the sprawling Red Wash oil field in Utah's Uinta Basin has been installed for Standard Oil Co. of California, Western Operations, Inc.

The system, consisting of 44 remote stations, was installed by Bendix-Pacific division, Bendix Aviation Corp. The Red Wash system is a new application of Bendix-Pacific's Electro-Span, which is based on digital-data-transmission and remote control. The new system reports all malfunctions, and controls heaters used to keep pipelines hot so that the crude, with its high wax content, will not congeal.

Possible wide application in field automation is seen for the system because it reduces the number of pumper rounds and stabilizes central control operations.

Red Wash field, discovered in 1951 by The California Co., covers 26,000 acres in Uintah County. It is more than 15 mi. long and 3 mi. wide, on a north-south axis. There are 88 producing wells on 80-acre spacing within its unitized area. Exploration and development continue.

Production of 29-gravity crude, at 90F to 105F, comes from the Green River sandstone at 5,200-6,200 ft.

Problems in handling the high-wax-content crude at Red Wash are increased by the many miles of flow and gathering lines subject to severe winter temperatures.

There are about 40 mi. of well flow lines, and 15 mi. in the principal gathering system, over the wide, rugged area.

Temperatures in the basin range down to 20F below zero in winter. But even the average annual temperatures are well below the pour point of the oil.

Other difficulties arise from the fact that the central tank battery and other operating facilities are located largely in the eastern sector of the pool.

The danger that pumps, flow lines, gathering systems, separator plant lines, and the like, will wax up is always present. Immediate warning, therefore, is necessary if a production rate of 10,000 b/d is to be maintained in the field.

Electrically energized heater cables were wrapped around flow lines and gathering-system pipe to combat the wax problem in the early days of the field's life.

A central-station, gas-fired Diesel generating plant, producing up to 1,600 kw., was installed by The California Co. to feed the cables, which kept the lines hot. This system also provided energy for pumping at the field. The wells are pumped, not because of bottomhole pressure drop, but because of the need to agitate the oil so that it doesn't wax up while coming to the surface under normal flow conditions.

Standard of California, which took over operations from its subsidiary several years ago, has installed a series of gas-fired heaters.

One heater is installed at each wellhead. Others are used to produce boiler steam at each collection station. The crude moves up from the well through the heater and is pumped to a collection station, each of which serves from four to eight wells.

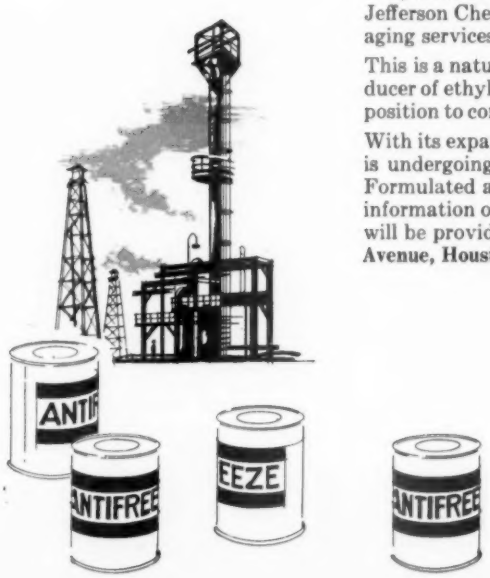
The crude is heated again by steam pipe at the station, where gas is separated. Some gas goes to compression for reinjection into the formation at the rate of 11-million cf/d, to maintain pressure. Other gas is used as fuel for heaters, for electrical generation, and for other lease purposes. No gas is flared.

The gas-fired heaters have replaced the electrically energized cables in normal line operations. It is here that the automatic control and alarm system comes into play.

The alarm console, located at the central tank battery, is laid out so that each major panel controls one collection station and the wells feeding into that station.

More than 30 individual control points are provided in each panel. Less than half of the possible control areas on the panel are being used at present, leaving the way open for a planned increase in field automation.

The major attention of the control operator at the central tank battery



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With its expanded plant facilities nearing completion, Jefferson Chemical Co. is undergoing a program of diversification and new product development. Formulated antifreeze is one step in Jefferson's expanding future. Complete information on the company's formulated private label antifreeze "package" will be provided upon request. **Jefferson Chemical Company, Inc., 1121 Walker Avenue, Houston 2, Texas.**

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is given to maintaining temperatures at all levels of the flow lines and gathering system.

If a gas-fired heater near a wellhead goes out, and a temperature drop results, a red light appears immediately on the control panel.

The stations can be "reviewed" electronically by the operator in less than a minute and a half. The system can be set so that an automatic monitoring of the oil network in the weak terrain of the west sector of the field can be had in one hour, or every two or four hours—whichever the operator wishes.

If an alarm condition occurs, the master control station can "interrogate" each of the remote stations to pinpoint the trouble.

The operator takes corrective action by energizing the heater cables at the specific area required. A pumper is then dispatched by two-way radio to restart a heater, repair a shutdown pump motor, or check a wellhead pressure drop, which would indicate waxing up in the well.

The gas-fired boilers providing heat for the collection station operations and gas separation also are tied into the alarm system.

From collection stations, the crude moves to 40,000 b/d of steampipe-heated storage at the central tank battery.

From there, it moves at the proper time into the 56,000 b/d crude facilities of Stancal's Salt Lake Pipe Line Co., running from Rangely field, Colo., to Salt Lake City.

Heater station and other facilities keep the crude hot on the way to the main transmission line. After discharge, generally lasting 3½ days, low-pourpoint Rangely crude is backflowed over the 7½-mi. line so that it won't wax up during inoperative periods.

Wells in the immediate vicinity of the central tank battery have not yet been hooked into the alarm and control system, because they're readily visible to hands in the operating area.

Gas-Water Injection Has Big Future

Atlantic engineer says this type of miscible displacement may become a leading method of secondary recovery.

Gas-plus-water injection appears to be the most promising method of recovering oil by miscible displacement, according to W. F. Kieschnick, research supervisor for Atlantic Refining Co.

Recoveries approaching 100% can theoretically be achieved with use of the gas-water process, Kieschnick told petroleum engineering students at the University of Texas last week.

"Of course," he added, "we don't get 100% recovery when we apply these estimates to a practical field situation, because we must allow for inhomogeneities such as stratification, which will prevent some of the reservoir from being contacted."

There are a few situations, too, in which the gas-water process cannot be used, Kieschnick said.

"For example, if the reservoir is very tight—that is, if the permeability is too low—it would take too many injection wells to inject the necessary volume of low-mobility water-gas system," he explained.

"Nevertheless," he continued, "in the vast majority of cases this device should be applicable.

"If for another more or something goes wrong in the miscible process to displace the miscible bank, the process will cease essentially to be a waterflood."

The gas-water system of miscible recovery combines the high sweep-out efficiency of waterflooding and the high displacement efficiency of the slug process, Kieschnick said.

Recent high-pressure gas is involved, he continued, all gas-driven miscible-displacement processes have a poorer sweep-out efficiency (percentage of reservoir contacted) than waterflooding. (PW—Dec. 5'58,p32)

"This is a relative weakness of the gas-driven process," he added.

On the average, Kieschnick said, "we would view a gas-driven propane-slug process as no better in recovery than a waterflood."

While the gas-water process will give recoveries approaching 100%, a gas-driven slug, on the other hand, makes a recovery of only about 70%.

Atlantic's research staff concluded that some combination of waterflooding and miscible sweep would achieve the desired goal: combining the high sweep-out efficiency of waterfloods with the high displacement efficiency (percentage of oil recovered) in a sweep of miscible slugs.

Here's how Atlantic applies the idea to the propane-slug process:

Propane is injected first. This is followed by a bank of natural gas, which mixes with the propane and pushes it along.

Natural gas and water are then injected together, in a ratio that maintains a gas bank back of the propane slug.

After the injection has proceeded to some time, much of the weep reservoir will be occupied by water and gas flowing simultaneously. To limit travel, water and gas flowing simultaneously have a low mobility. The rate with which a fluid will flow, much like water alone. This permits the miscible-displacement process to approach the sweep-out efficiency of water.

High pressures necessary for conducting gas-water and other miscible processes are an important limiting factor, Kieschnick said.

He noted that such processes must be carried out "at pressures of 1,000 psi or more—in order to make the gas miscible with the reservoir oil.

What is needed, Kieschnick continued, is an intermediate material which will permit operation at lower pressures.

For example, he said, alcohol would be a suitable agent, were it cheap enough. The alcohol would miscibly displace the oil, and the water would miscibly displace the alcohol. Pressures required for the process would be far less than with gas.

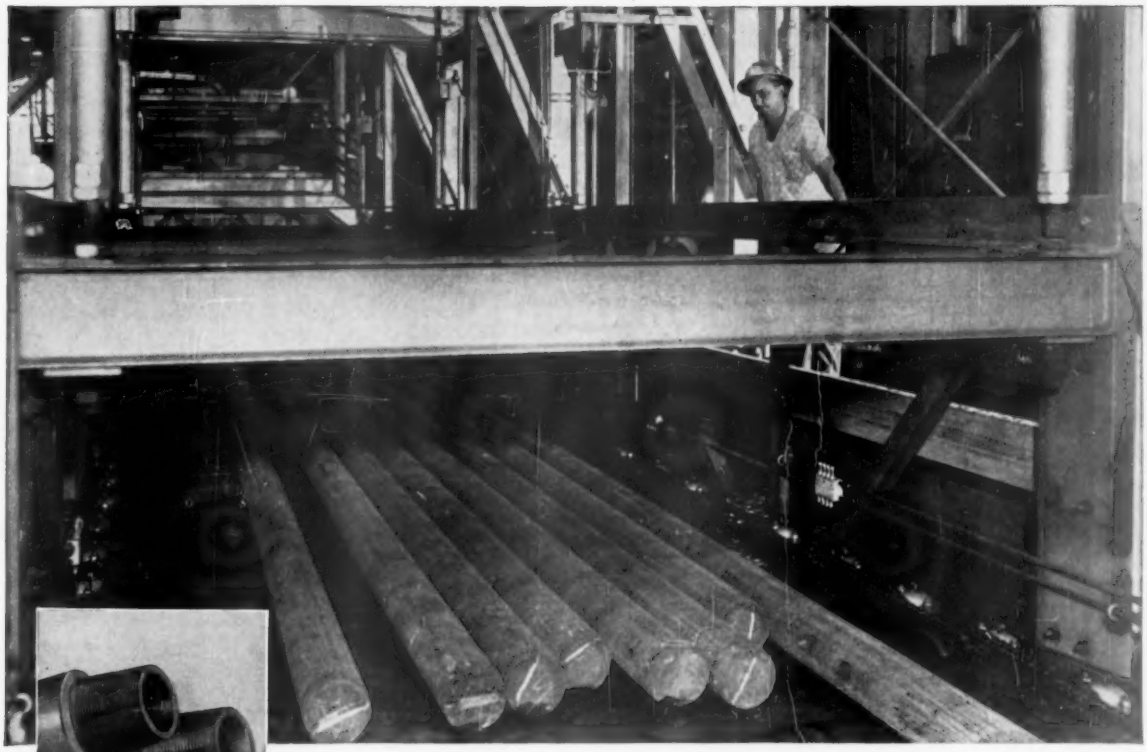
"I believe that there is a reasonably good chance that somebody will discover a material, or a material and a method, to achieve something equivalent to what I have just described," Kieschnick said.

The growing cost of natural gas also makes use of a cheaper miscible gas, such as flue gas, another key development in future miscible-displacement operation, the Atlantic engineer predicted.

Much of the gas now injected in gas-driven miscible-displacement operations merely serves the purpose of filling reservoir pore space, without taking part in the actual miscible displacement of the reservoir oil, he said.

If a cheaper substitute gas were available, however, "we might inject enough intermediate gas to attain miscible displacement and follow with cheap gas to fill up pore space."

The gas, which is a mixture of



Drill collar stock being lowered into quenching bath after heat treatment. (Sheffield's Houston plant.)

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"Nevertheless," he continued, "in the vast majority of cases, this device should be applicable.

"It has another merit: If something goes wrong in the miscible process to destroy the miscible band, the operation will revert essentially to a waterflood."

The gas-water system of miscible secondary recovery combines the high sweep-out efficiency of waterflooding and the high displacement efficiency of the slug process, Kieschnick said.

Because highly-mobile gas is involved, he continued, all gas-driven miscible-displacement processes have a poorer sweep-out efficiency (percentage of reservoir contacted) than waterflooding (PW—Dec.5'58,p32). "This is a relative weakness of the gas-driven process," he added.

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Atlantic's research staff concluded that some combination of waterflooding and miscible sweep would achieve the desired goal: combining the high sweep-out efficiency of waterfloods with the high displacement efficiency (percentage of oil recovered in a sweep) of miscible slugs.

Here's how Atlantic applies the idea to the propane-slug process:

Propane is injected first. This is followed by a band of natural gas, which mixes with the propane and pushes it along.

Natural gas and water are then injected together, in a ratio that maintains a gas band back of the propane slug.

After the injection has proceeded for some time, much of the swept reservoir will be occupied by water and gas flowing simultaneously, Atlantic found. Water and gas flowing simultaneously have a low mobility (the ease with which a fluid will flow), much like water alone. This permits the miscible-displacement process to approach the sweep-out efficiency of water.

High pressures necessary for conducting gas-water and other miscible processes are an important limiting factor, Kieschnick said.

He noted that such processes must be carried out at pressures of 1,000 psi. or more—in order to make the gas miscible with the reservoir oil.

What is needed, Kieschnick continued, is an intermediate material which will permit operation at lower pressures.

For example, he said, alcohol would be a suitable agent, were it cheap enough. The alcohol would miscibly displace the oil, and the water would miscibly displace the alcohol. Pressures required for the process would be far less than with gas.

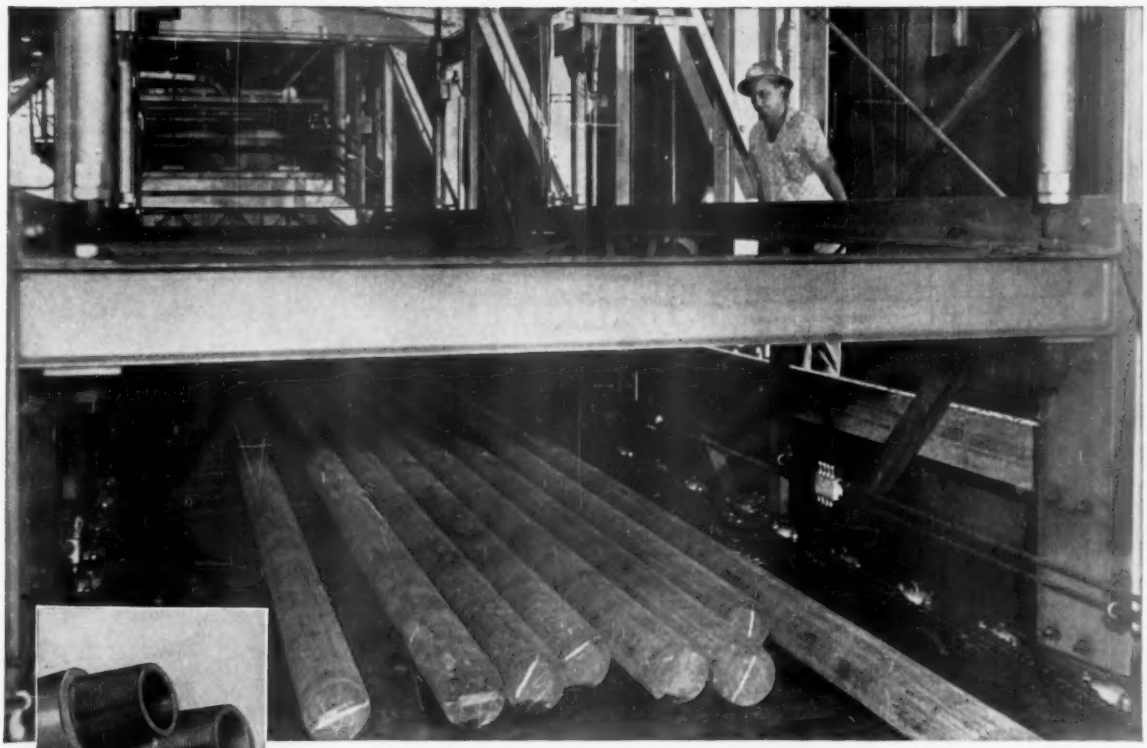
"I believe that there is a reasonably good chance that somebody will discover a material, or a material and a method, to achieve something equivalent to what I have just described," Kieschnick said.

The growing cost of natural gas also makes use of a cheaper acceptable gas, such as flue gas, another likely development in future miscible-displacement operations, the Atlantic engineer predicted.

Much of the gas now injected in gas-driven miscible-displacement operations merely serves the purpose of filling reservoir pore space, without taking part in the actual miscible displacement of the reservoir oil, he said.

If a cheaper acceptable gas were available, however, "we might inject enough hydrocarbon gas to insure miscible displacement and follow with cheap gas to fill up pore space."

Flue gas, which is a mixture of



Drill collar stock being lowered into quenching bath after heat treatment. (Sheffield's Houston plant.)

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nitrogen from the air and carbon dioxide, can be made relatively inexpensively, Kieschnick said. It also can be an assured supply, since large volumes can be made by burning small volumes of hydrocarbons.

Flue gas also may be considered for direct miscible displacement, he added, although this would require operating at even higher pressures than with hydrocarbon gas. Or it can be used to push a slug of LPG intermediates through the reservoir.

Miscible displacement also may be used to recover more oil from "watered-out reservoirs," Kieschnick said.

He reported that it has been learned from laboratory research that a miscible-injection operation will bank up residual oil left after a waterflood, or after a natural water drive, and permit this oil bank to flow and be produced.

Although this application involves the disadvantage of requiring the production of considerable water before the oil bank is produced, Kieschnick continued, it is worth considering because the alternative is to abandon the reservoir.

"It's a way to get a third crop of oil after waterflooding," he said.

Although miscible displacement "is not a panacea," Kieschnick said, it is now well on its way to becoming an established method of secondary recovery, taking its place along with waterflooding as a major injection process for increasing oil recovery.

Kieschnick said the various miscible processes—high-pressure gas injection, propane-slug, condensing-gas drive, and others—can best be identified "as the concept back of a multimillion-dollar industry effort to recover more oil."

He predicted development of an "array" of miscible processes to cover various operating conditions.

But, he added, "waterflooding will still be fashionable in some areas ten years or more from now, notwithstanding new developments."

"We believe we know how to recover more oil with miscible displacement than with waterflooding under many circumstances," he said, but added that the factor of added expense may dictate the use of water in many cases, regardless.

Kieschnick's talk was one of a series given by Atlantic experts at the university over the past several weeks.

What's New / IN EXPLORATION, DRILLING, PRODUCTION

Oregon Wildcat Raises State's Oil Hopes

Hopes are high that a wildcat near Lebanon, Linn County, Ore., may turn out to be the state's first oil producer.

Linn County Oil Development No. 1 Barr, section 32-11s-1w, about 35 mi. northwest of Eugene, reportedly encountered about 20 ft. of gas sand just below 2,290 ft., and 20 ft. of oil sand just below 4,300 ft. Both zones are believed to be of Oligocene age. The oil recovered is estimated to be about 17-gravity.

The test reportedly was based on surface geology.

The 4,529-ft. test has 5½-in. casing cemented to 4,402 ft. A fish—collars with bit—was left in the hole and cemented over, with the top at 4,424 ft. At last report, the hole was being tested for water shutoffs. Next step will be perforating for production.

Oregon has been the scene of sporadic drilling by several companies, including some majors.

The company backing the wildcat is a Lebanon-based closed corporation formed by ten agricultural men. P. L. Turnidge is president.

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A slimhole completion, believed to be the first of its type in California, may pave the way for further use of such completions there.

Standard Oil Co. of California drilled No. 33 15B, section 15-31s-23e, Kern County, to 4,055 ft., then cemented 2⅞-in. tubing on bottom to serve as casing, jet perforated an interval at 3,935-74 ft., and hung 1¼-in. macaroni string at 3,757 ft. to serve as tubing and rods.

Normally, in completing a well of this type in the Buena Vista Hills fields, the company would have used 7 in. casing with 5½-in. perforated liner, 2-in. tubing, and ¾-in. rods.

The new well came in on the pump for 80 b/d of 26-gravity oil. Other producers in the same horizon—the Sub Scalez and Mulinia sands—produce from 35 b/d to 80 b/d on the pump.

Use of the smaller strings is expected to result in a saving in well pipe alone of about $10,000. The company is studying results of this well to determine whether slimhole completions can be used in California as money-saving measures.

The Texas Railroad Commission has approved unitization agreements covering 9,000 acres in Midland Farms fields, Andrews County.

Pan American Petroleum Corp. told the commission last week that "considerably" more oil can be recovered by cooperative injection of gas and water into the reservoir.

Three water-injection permits were approved: for Honolulu Oil Corp. in Cope field, Sterling, Reagan, and Tom Green Counties; for Cities Service and The Texas Co. in the Wilham Sand reservoir, Wilbarger County; and for S&S Oil Co. in the Bluff Creek sand, Lewis Steffens field, Jones County.

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Montana's Blackfeet Indian Tribal Council received offers totaling $1,611,876 for oil and gas leases on 25,606 acres of reservation land.

Of this, $1,609,539 in bonuses was offered for 24,734 acres of tribal land, and $2,337 for 872 acres of allotted Indian land.

Acreage is in a 21-mi. strip running south from the Canadian border, south of Pincher Creek natural gas field.

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An additional 1.2-billion bbl. of water will be injected into the Wilmington-Long Beach (Calif.) oil field as part of a repressuring program.

Companies representing about 95% of the oil production of Fault Block

Four have agreed to the block's unitization. This action paves the way for an $18-million water injection program in the fault block, designed to restore original underground pressure within five years.

The program calls for drilling 35 new injection wells, and converting 25 oil wells into injection wells.

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Continental Oil Co. is asking unitization consent from about 400 royalty owners in Cat Creek field, Petroleum County, Mont. Continental is proposing to waterflood the field.

Unitization would affect the main producing portion of the field, in 15n-19e. Production is from Cat Creek sands, Morrison, and Ellis. During September, the field's 72 active wells produced 12,719 bbl. of oil.

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Drilling Highlights

Alaska—Standard Oil Co. of California No. 2 Swanson River Unit, 2 mi. south of Richfield Oil Corp.'s 1957 discovery on the Kenai Peninsula, flowed at the rate of 15-20 bbl. of 29-gravity oil per hour on 2-hour test at 11,038-60 ft., in a zone beneath the main sands in which No. 1 Swanson River was completed.

Illinois—T. W. George No. 4 William R. Utley, section 34-7s-8e, Gallatin County, was completed for 1,400 b/d through perforations at 2,718-30 ft. in the Aux Vases. The prolific producer, ½ mi. northeast of Omaha Dome pool, is in an area of heavy current activity (PW—Nov.28'58,p19).

North Dakota—Stewart Petroleum Co. No. 1 Olsen, section 3-160n-94w, Burke County, recovered 360 ft. of frothy mud-cut oil on 1¾-hour test of the Midale at 7,720-59 ft. The wildcat is 4 mi. northeast of North Tioga field.

Wyoming—Pan American Petroleum Corp. No. 1 Robinson, section 32-50n-67w, Crook County, was completed as a Pennsylvanian discovery for 294 b/d of 28-gravity oil on the pump through perforations at 6,065-80 ft. in the Minnelusa. Nearest Minnelusa production is at Donkey Creek field, 5 mi. west.

Kansas—R. G. Lawton No. 1 Rueb, section 13-3s-42w, Cheyenne County, recovered 2,595 ft. of slightly mud-cut oil and 105 ft. of oil-cut salt water on test of the Lansing-Kansas City at 4,512-54 ft. Original belief was that the recovery was from the Topeka lime, but electric logs corrected tops. The prospect is 35 mi. northwest of Llanos field, Sherman County.

Montana—Shell Oil Co. and Northern Pacific Ry. No. 12-23 Unit, section 23-9n-58e, Fallon County, was completed on the pump for 218 b/d through perforations at 8,400-506 ft. in the Silurian. The discovery is 3 mi. south of Cabin Creek field.

Southwest Texas—Lion Oil Co. and Carrl Oil Co. No. 1 Dubose, 6½ mi. northwest of Gregory, San Patricio County, was completed for 233 b/d of 33-gravity oil through 10/64-in. choke and perforations at 9,372-80 ft. in the Commonwealth section of the Basal Frio.

Oklahoma—Calvert Drilling Co. et al No. 1 Joy, section 30-18n-17w, 4 mi. northeast of Dewey County's only pool—West Valley Center—recovered 420 ft. of 45-gravity oil on 3-hour drillstem test of the Oswego (Pennsylvanian) at 8,731-808 ft. Gas showed in 10 minutes at the rate of 150,000 cf/d.

In Beaver County, Ohio Oil Co. No. 1 Snell, section 16-3n-26e, flowed 250 bbl. of 40-gravity oil in 11 hours through ½-in. choke and perforations at 7,620-36 ft. in the Chester. The discovery is 3 mi. north of Clear Lake Morrow oil pool.

West Central Texas—Fletcher Oil & Gas Drilling Corp. No. 1 W. M. Reid, Red River County school land survey No. 74, Haskell County, was completed for 240 b/d through 16/64-in. choke and perforations at 4,866-69 ft. The Strawn pay discovery is 2 mi. south of Webb field.

South Dakota—A. L. Schlaikjer and Herb Clarkson No. 1 Government, section 23-21n-3e, Harding County, was completed for 12 bbl. of 34.9-gravity oil per hour through perforations at 8,474-84 ft. in the Red River. The discovery is 4 mi. west of Buffalo field.

Nebraska—Two J sand discoveries have been completed in Kimball County. Hickerson & McCulloch and Exeter Drilling Co. No. 1 Mockett, section 20-14n-56w, was completed on the pump for 224 b/d through perforations at 6,664-67 ft. The well is 1¾-mi. west of Durland field. Don Rounds and Chandler & Simpson No. 1 Linn, section 31-15n-54w, was completed on the pump for 165 b/d through perforations at 6,014-20 ft. The find is 1½-mi. southeast of Owasco field.

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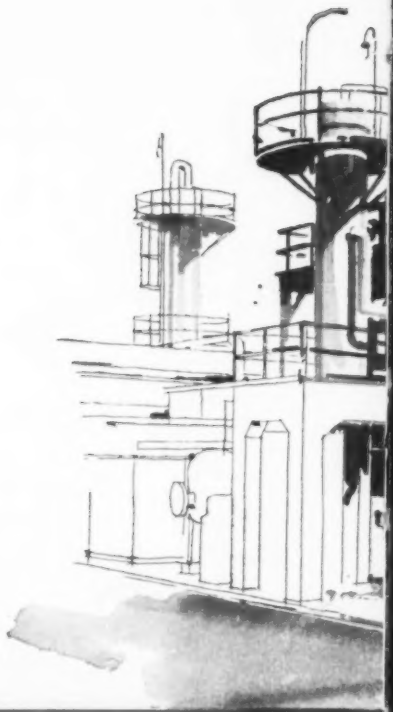

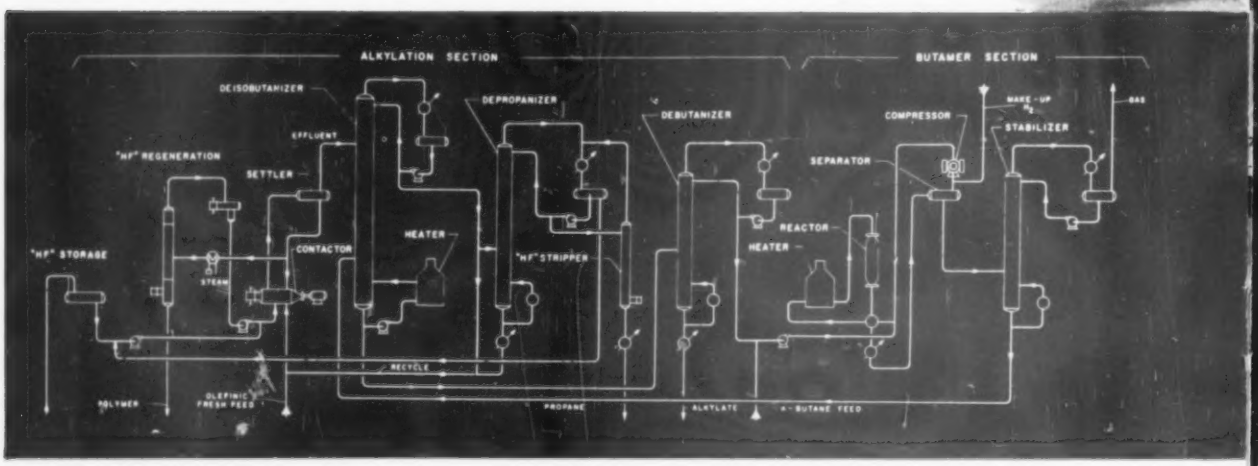

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Processors Start Swing to Air Coolers

Processors, concerned with growing shortages—and costs—of process-cooling water, are turning to air-cooled heat exchangers as a partial solution to their problems.

Water has been the process industry's "work horse" for cooling since the birth of heat transfer equipment. However, with the rapid growth of the chemical and petroleum industries, water has become a precious commodity in many highly industrialized areas.

Until the last few years, air-fin coolers were pretty much limited to natural gasoline plants in the more arid regions of the U.S., plus a few very specialized installations in the refining and chemicals industry. Now they are being considered for just about every cooling job a refinery has.

These facts were brought out in seven separate reports on the subject to the annual meeting of the American Institute of Chemical Engineers in Cleveland last week. They were given by K. D. Segel, Esso Research & Engineering Co.; R. G. Perkins, Celanese Corp. of America; R. T. Mathews, E. I. du Pont de Nemours & Co.; E. V. Nakayama, Phillips Petroleum Co.; J. W. Thomas, Standard Oil Co. (Ohio); J. F. Todd, Magnolia Petroleum Co.; and Donald Q. Kern, D. Q. Kern Associates, and Ralph E. Seaton, Wolverine Tube.

Even in cases where air coolers will not do the job by themselves, often they can be used to advantage in combination with a small water-cooled exchanger.

Some cooling applications require that the process-stream temperature be lowered near to, or even lower than, that of the available cooling air. In such instances, the air cooler is either unable to do the job, or will not do it economically, compared to water-cooled equipment.

A solution to this problem, given by Segel, is to perform the "high-level" cooling with air units, then finish cooling to the desired lower temperature level with "trim-cooler" water units (table).

Growing realization of the potential economic advantages of using air for process-stream cooling has been a big factor in the increased interest in air coolers among processors.

While only a limited number of air coolers are now in use in the refining industry, a large number are in the design and construction phases, Segel said.

Segel also pointed out that air cooling of a fluid is generally cheaper than water cooling in cases where the maximum expected air temperature is at least 40F lower than that of the cooled fluid. For temperature differences of less than 40F, there is no generalization, and each case must be studied on its own merits.

Nakayama agreed essentially with Segel, but said that a generally economical temperature difference between the air and the cooled fluid could be from 35F to 40F.

Both investment and operating costs for air cooling systems are often lower than for equivalent water-cooled units.

Air-cooled exchangers are not cheap, and often cost more than water-cooled units doing the same job. However, in addition to the exchanger itself, the only added investment needed is for an electrical distribution system. Water-cooled units, on the other hand, require water lines, water towers, water treating equipment, makeup and blowdown facilities, circulation systems, and, sometimes, water disposal facilities. These, added to the basic cost of the water cooler, very often throw the economics in favor of air cooling (table).

Operating costs, too, are usually lower for air coolers, with the only "out of pocket" expense being for electric power. Operating expenses for water coolers are higher because of the extensive, complex water-handling equipment needed.

Maintenance costs for air coolers are only a fraction of those needed for water coolers. Major maintenance items for air-cooled units include only drivers, gear boxes, and fans. Water-cooled units require a much more costly maintenance program covering the entire water-handling system.

Cleaning is much simpler for the air-cooled units, too. There is no "water side" to foul and corrode as there is for water-cooled units.

Perkins reported that maintenance costs for air-cooled units in Celanese's Pampa (Tex.) petrochemicals plant averaged only 30% of those needed for equivalent water-cooled units. This figure excluded corrosion and fouling of heat-exchange tubes due to the process fluid.

Another estimate of maintenance costs, by Esso Research's Segel, including internal cleaning of process tubes, is that air-cooled units cost only 50% as much to maintain as do water-cooled units.

Mathews, of Du Point, said his company's estimates showed that maintenance cost of air-cooled units is only 25% of that of water-cooled units. He added, however, that this figure assumed "average" cooling-water conditions and that the relative expense to maintain water-cooled equipment using brackish or contaminated water would be higher. Conversely, the relative expense would be lower when using "pure" cooling water.

There appear to be many other advantages in the use of air-cooling. Among those cited at the meeting:

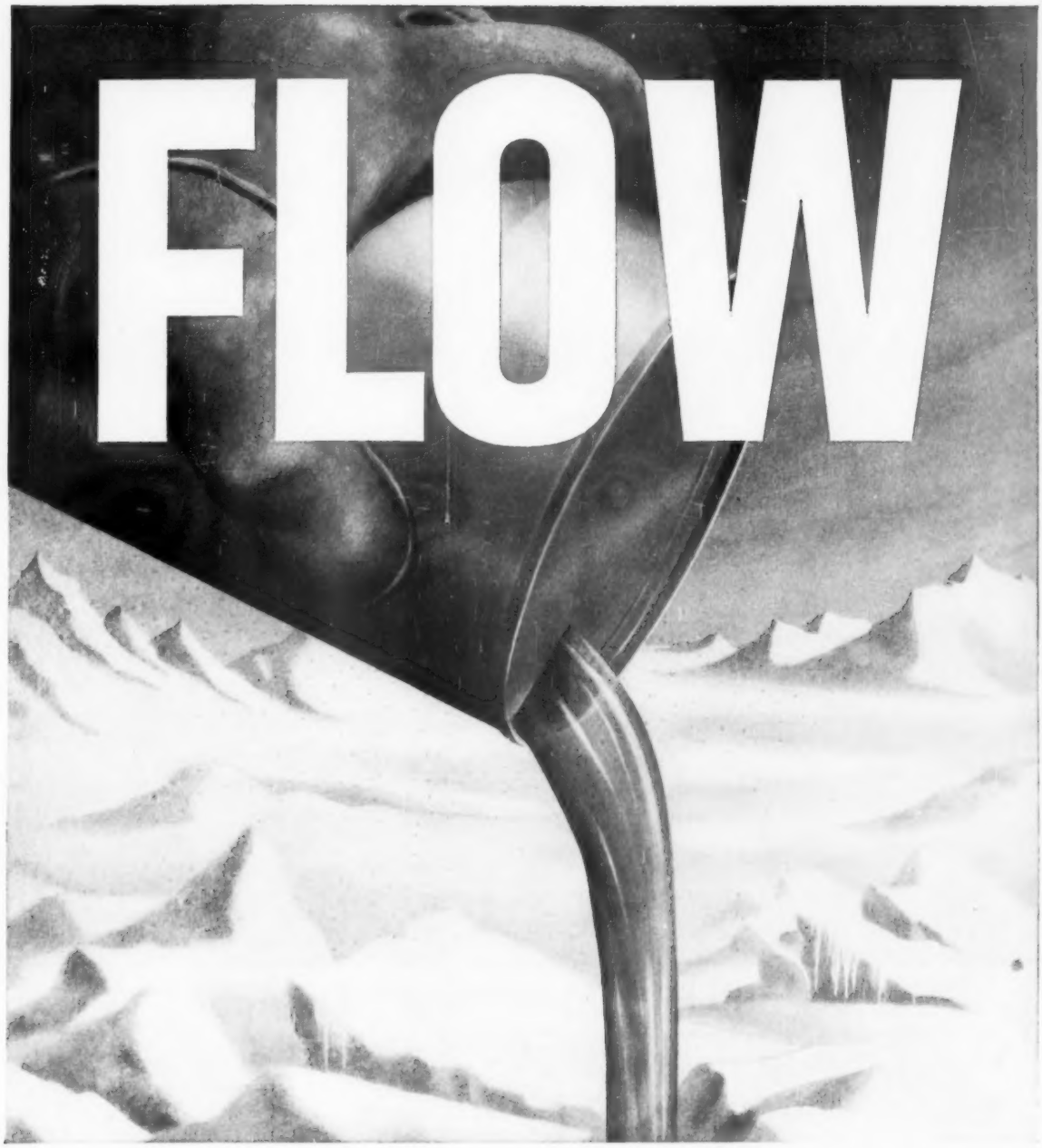
- There is greater on-stream reliability with air-cooled units.
- Costly disposal of cooling-tower blowdown is eliminated.
- Expansion of cooling facilities is easier because it is not dependent on availability of a water supply.
- There is greater flexibility in

How Water, Air, and Air + Water Compare for Cooling Fuel Oil

	Investment Costs			Annual Operating Costs	% Saving Compared to Water	
	Onsite	Offsite	Total		Investment	Operating
Water-cooled[1]	$360,000	$369,000	$729,000	$55,000	—	—
Air-cooled[2]	$640,000	$ 54,000	$694,000	$54,000	5%	2%
Combined[3]	$520,000	$ 29,000	$549,000	$31,000	25%	43%

Oil in at 260F, out at 150F. Heat removed: 74.7-million Btu. an hour. Air at 95F.

(1) Cools from 260F to 230F with worm cooler; from 230F to 150F with shell-and-tube exchanger.
(2) Uses air cooler only, for entire cooling range.
(3) Cools from 260F to 170F with air cooler; from 170F to 150F with shell-and-tube "trim cooler."
Data: K. D. Segel, Esso Research & Engineering Co.



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locating a plant, because availability of water is not a criterion.

- There is no fouling problem on the air-side of the exchanger tubes.
- Less expensive metals can be used for lower-temperature sections; in a water-cooled unit, high-temperature metals must be used throughout the entire unit.
- Water-cooled units require expensive bimetallic tubing to prevent stress corrosion caused by chlorides on the water-side of the exchanger.
- In areas of growing water scarcity, air coolers help preserve an investment that might otherwise be jeopardized.

But there are also many problems involved in the use of air-cooled units. These will have to be solved before air cooling can realize its full potential, according to Segel, Perkins, and Mathews.

Among objections to available air-cooling units reported by processors:

- Location of air coolers is critical, both because of their size and because of their susceptibility to corrosion if they are near vent stacks or condensing exhaust steam from other units.
- Leaks from the open-system exchanger tubes allow toxic or combustible fumes to enter the air; water-cooling units are "closed-system."
- The noise level of many air coolers is too high.
- Conventional horizontal air coolers now available in the U.S. afford poor protection against solidification of high-melting-point fluids.

Another major objection, expressed by Esso Research's Segel, is that there is no consistency in designs and specifications between air coolers from different manufacturers. This greatly complicates the job of selecting the proper unit for a given job.

Most users hope that more field, operating, and maintenance experience will lead to less over-design and greater standardization in design to help in the selection and use of air coolers for process plants.

Though the full potential of air coolers is far from realized, and many problems remain to be solved, such equipment is already used extensively in some areas.

Natural gasoline plants and pipe lines have long been users of air-cooled equipment, especially in the more arid portions of the U.S. But now many U.S. processing companies have either installed, or are seriously considering, air-cooled units. Standard of Ohio, for instance, has 11 such units at its new Toledo refinery.

In Germany, where industrial water costs have risen rapidly since World War II, air-cooled exchangers are being used in both refineries and chemical plants. Esso Nederland N.V. will use only air coolers in the new refinery it is building at Rotterdam.

What's New / IN PROCESSING AND PETROCHEMICALS

Imperial Oil Ltd. has contracted to have an avgas alkylation unit built at its Winnipeg (Manitoba) refinery.

The capacity of the unit will be 650 b/d of aviation alkylate. Cost of the project is estimated at $2.6-million. Engineering work has been under way for several months, and construction crews will move onto the site this spring. Completion is scheduled for around the middle of September, 1959.

Handling facilities and tankage will also be built, as well as a light-ends fractionation unit to furnish feed for the unit. Canadian Bechtel, Ltd., is the contractor.

According to an Imperial Oil spokesman, this alkylation unit will be the second of its kind in the Canadian prairies. Its output will replace alkylate now imported from the U.S.

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Two new American Petroleum Institute publications, covering recommendations for heat exchange equipment, are now available.

RP 530, "API Recommended Practice for Calculation of Heater-Tube Thickness in Petroleum Refineries," is available for $6.00. It contains 22 pages of text and 154 charts.

Chapter VII, "Heat Exchangers, Condensers, and Cooler Boxes," of the "API Guide for Inspection of Refinery Equipment," is available for $2.00. It contains 31 pages, including illustrations.

Both of these publications are first editions, 1958, and can be ordered from the Publications Dept. American Petroleum Institute, 50 West 50th St., New York 20, N.Y.

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A multimillion-dollar octane-improvement project has been completed at Shell Oil Co.'s Norco (La.) refinery.

The project involved construction of several major operating units, the principal one being a 16,000 b/d Platformer. The purpose of the work was "to enable the refinery to continue manufacturing gasoline with octane levels as high as all Shell competitors."

•

The American Petroleum Institute will discontinue its three viscosity standards, alpha, beta, and gamma, effective Jan. 1, 1959.

In their place, Cannon Instrument Co., of State College, Pa., will offer seven new oil standards for viscometer calibration, under sponsorship of the American Society for Testing Materials. Cost of the new standards will be $15 a pint.

API says the 1958 versions of ASTM Tentative Method D-445 for kinematic viscosity, and ASTM Standard Method D-88 for Saybolt viscosity, will refer to the new viscosity series.

•

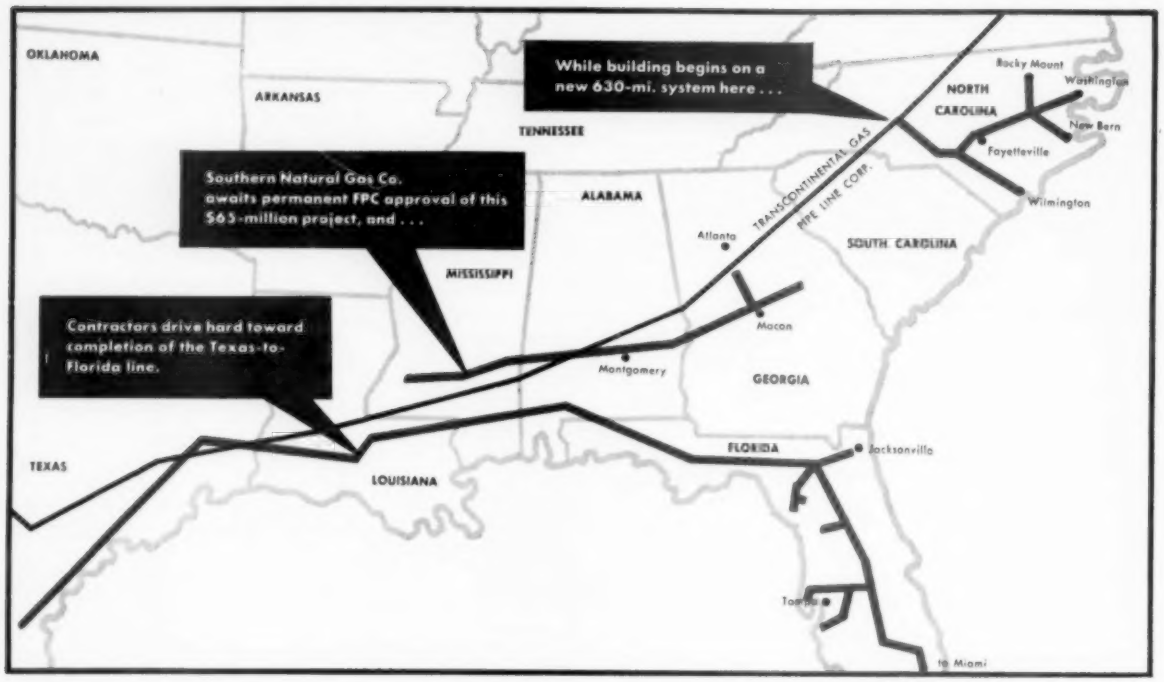
Two Lion Oil Co. researchers have developed a new process for stabilizing acrylonitrile, a chemical used in making synthetic fibers.

The developers of the process are Fred Applegate and R. A. Franz. Acrylonitrile is manufactured by Monsanto Chemical Co., parent of Lion Oil.

•

Australia's first styrene monomer plant will be a joint venture of Monsanto Chemicals (Australia), Ltd., and Petroleum & Chemical Corp., Ltd.

The plant will be located at Sydney, and will cost $4.5-million. Startup is scheduled for late 1960. Petroleum & Chemical Corp, is Australia's first petrochemicals maker. Its partner (the Australian Monsanto Company) is controlled by U.S. and United Kingdom Monsanto companies.



Southeast: Fertile Ground for Gas Lines

Industrial and population growth in the area have made for markets too big to be left without gas supply. New transmission systems will see that they're not.

The "new," increasingly industrialized Southeast is looking to new natural gas transmission systems to help satisfy its growing energy needs.

There's no denying that, during the postwar period, a good many manufacturing companies have found new homes in Alabama, Florida, Georgia, and the Carolinas. This growth in southeastern industrial activity, along with a corresponding population rise, has resulted in a steep climb in energy needs in many parts of the region.

Demand for natural gas, a relatively cheap source of energy, has risen substantially during the period. So gas transmission companies are now playing catch-up-with-demand by building new lines.

The latest example: Work is just beginning on a new 630-mi. grid to bring natural gas to 22 communities and several industrial customers in North Carolina.

North Carolina Natural Gas Corp. has just started to lay pipe for the system. When the line is completed some time next spring, gas will flow from a takeoff point on Transcontinental Gas Pipe Line Corp.'s mainline, in Iredell County, to Wilmington, New Bern, and Washington, on the Atlantic Coast—as well as to many cities along the way.

The system will have a delivery capacity of 72-million cu. ft. of gas daily. Its 16-in. mainline will run from the Transcontinental system to Wilmington. A lateral will branch off near Lumberton to serve Fayetteville and other central-state cities.

North Carolina Gas points out that the system is serving an area where, "in recent years, industrial growth has been rapid . . . In the area served by the company, 206 manufacturing plants were added between 1947 and 1956."

R. A. Ransom Co., of Washington, D.C. is the contractor for the system.

More sensational than the North Carolina project, however, is the $200-million pipeline system that will take southwestern gas to some 47 Florida cities.

Houston Corp. is building the line all the way from the Rio Grande to Miami (PW—May30'58,p39). The system, some 2,609 mi. long from producing fields to utility customers, will have an initial capacity of 280-million cf/d. Inside of two years, however, this capacity is expected to reach 415-million cf/d.

Work on this system is now progressing smoothly, and the system stands a good chance of making its initial deliveries by June 1.

F. E. Stanley, president and chairman of the board of Houston Corp., recently summed up construction progress on the line this way:

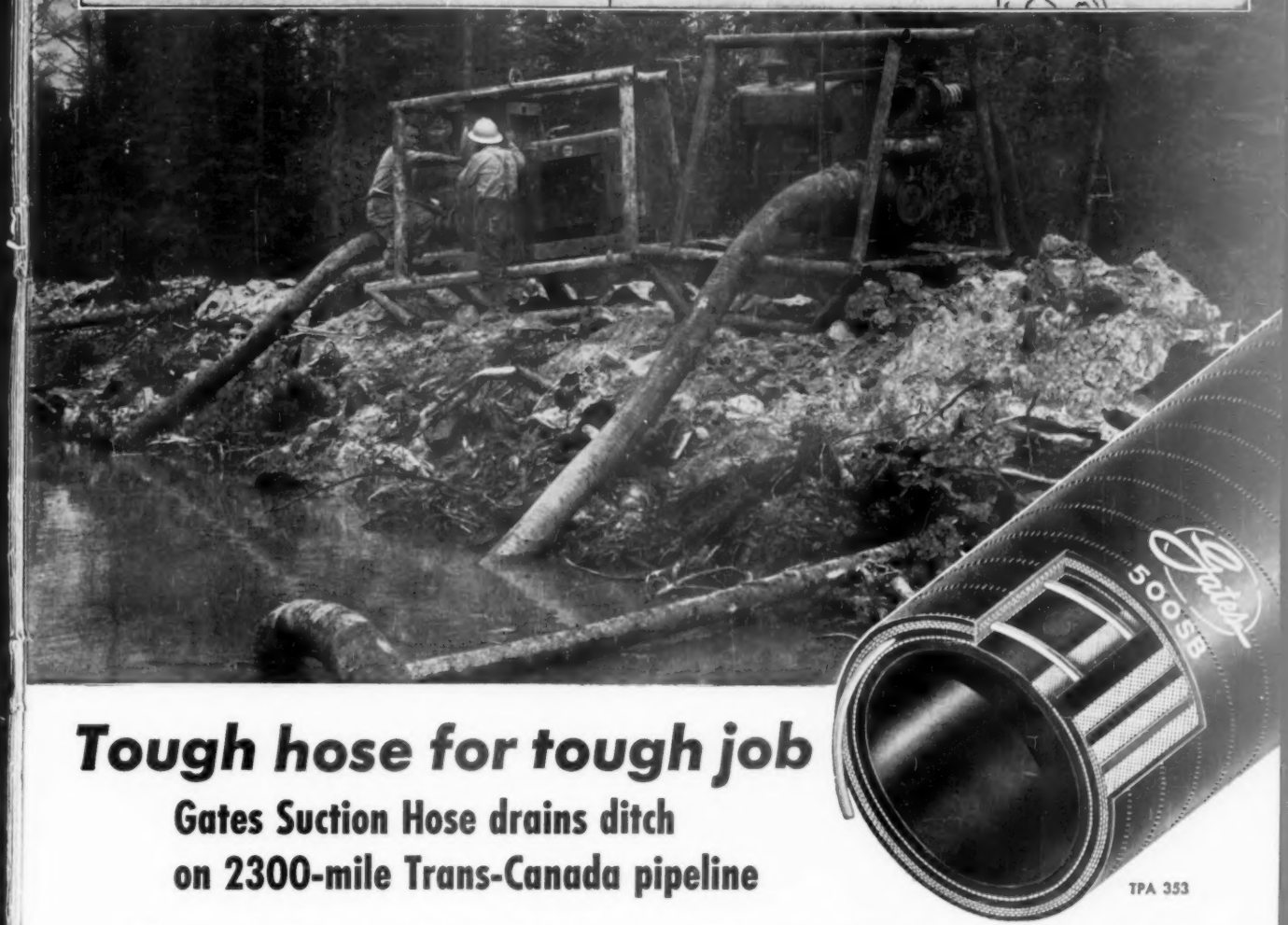
"Pipeline construction crews are at work along the main and lateral lines in each of the states the line will traverse . . .

"Construction work is under way on five compressor stations . . . and work on the remaining three stations will commence in the immediate future.

"We believe that the very satisfactory start of construction will enable us to have natural gas available throughout the entire state of Florida by our scheduled date, June 1, 1959."

Southern Natural Gas Co. has still another project in the works to help meet southeastern natural gas demand—a $65-million expansion pro-

You find Gates Hose where anything flows: The 2300-mile Trans-Canada pipeline project runs through rugged country. Where water is a ditching problem, tough Gates Contractors Suction Hose is put to work getting rid of it. This pipeline will provide natural gas for some 4,250,000 customers from Montreal to Saskatchewan.



Tough hose for tough job

Gates Suction Hose drains ditch on 2300-mile Trans-Canada pipeline

TPA 353

Industry everywhere depends upon Gates Industrial Hose to provide air, water, steam, oil and suction for every type of application . . . including some of the toughest jobs in the world.

Tens of thousands of miles of Gates Hose are in daily use . . . every type and size from air hose the diameter of a pencil to petroleum hose as big as the mains in city streets.

Back of the world-wide acceptance of Gates Hose is a continuing program of *specialized* hose research at the multi-million dollar Gates Research Center staffed by more than 200 chemists, physicists, engineers and technicians.

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Because Gates Hose is so widely preferred, it is quickly available from leading distributors in all industrial centers in the United States and in 90 countries throughout the world . . . and its performance is guaranteed by the

World's Largest Maker of V-Belts.

Gates 500SB Contractors' Suction Hose — a heavy duty water suction and discharge hose for conveying large volumes of water in trench and sewer work. Heavy spring steel wire and multiple plies make it virtually crush proof. This rugged hose, one of the wide variety of industrial hoses made by Gates, is readily available from your nearby Gates distributor.

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Gates Industrial Hose

Made in a Full Range of Types and Sizes

gram for its system throughout the area (PW—Mar.21'58,p46).

Southern, already well along in building its new facilities, intends to add 1,200 mi. of pipe to its system in Mississippi, Alabama, and Georgia. This would permit the company to deliver an additional 300-million cf/d.

Southern has received temporary Federal Power Commission approval of its plan; commission hearings for permanent approval begin Jan. 20.

The need for such lines—and any future lines—is made clear by the over-all southeastern industrial growth picture.

A check of Census Bureau studies presents these telling figures about industrial growth in the area:

Capital expenditures in the area show a healthy rise. Latest available figures show a 1955-to-1956 increase throughout the area: from $160-million to $195-million in North Carolina; from $83-million to $101-million in South Carolina; from $193-million to $232-million in Georgia; from $63-million to $117-million in Florida; from $95-million to $239-million in Alabama.

Expenditures for fuels and energy by industry in the area nearly doubled between 1947 and 1955.

Such spending rose from $46-million to $82-million in North Carolina; from $29-million to $66-million in South Carolina; from $33-million to $59-million in Georgia; from $15-million to $44-million in Florida; and from $103-million to $126-million in Alabama.

Population trends throughout the region also help to explain the blossoming natural gas demand.

From 1950 through mid-1958, according to Census Bureau estimates, population rose 12% in North Carolina; 14% in South Carolina, 11% in Georgia; 5% in Alabama—and 60% in Florida.

The population rise doesn't tell the whole story, however. What makes the rise important is the fact that much of it has occurred in cities, which are the major potential gas markets.

Pipeliners Hail Memphis Decision Reversal

Natural gas pipeliners last week hailed the Memphis Decision reversal, which reestablished the long-standing procedure for their rate increases (PW—Dec.12'58,p8), as a boon to the industry and a help in financing the growing list of pipeline expansion projects:

"The cloud cast over the industry . . . has now been cleared away . . . In my opinion, the industry will continue its phenomenal expansion and natural gas service will continue to take its important place in the national economy."

—PAUL KAYSER, PRESIDENT, EL PASO NATURAL GAS CO.

"This latest decision puts rate procedures back the way they were. This action should help transmission companies earning-wise and from the standpoint of financing."

—JAMES B. HENDERSON, VICE-PRESIDENT AND GENERAL COUNSEL, TRANSCONTINENTAL GAS PIPE LINE CORP.

"The fact that the court has seen fit to restore the established rate-making procedure of the Federal Power Commission is certainly heartening . . . Texas Eastern management has always been optimistic that the court would clarify this situation, and the company has gone ahead with plans to serve its customers."

—ORVILLE CARPENTER, PRESIDENT, TEXAS EASTERN TRANSMISSION CORP.

"We are very happy over this decision. It is without question the right decision and is good for the entire natural gas industry."

—WILLIAM M. ELMER, PRESIDENT, TEXAS GAS TRANSMISSION CORP.

"[The decision] will make it possible to initiate and carry out future natural gas expansion projects more expeditiously."

—ESKIL I. BJORK, CHAIRMAN, PEOPLES GAS LIGHT & COKE CO.

What's New
IN TRANSPORTATION

Alberta Board to Get Two Gas-Export Plans

Revised plans of two Canadian companies to export Alberta natural gas to California will come before the Alberta Oil & Gas Conservation board early next month, probably on Jan. 6.

The two companies, Alberta & Southern Gas Co., Ltd., and Westcoast Transmission Co., Ltd., plan to build a 36-in. 105-mi. pipeline from Alberta fields to the U.S. border. There the gas would be put into a proposed extension of the Pacific Northwest Pipeline Co. system (PW—Oct.24'58,p40).

Alberta & Southern is asking for permission to export 4.2-trillion cu. ft. of gas over a 25-year period.

Westcoast, asking for a permit to move 1-trillion cu. ft. over 23 years, says that it may revise the total upward in later applications to the board.

Trans-Canada Pipe Lines, Ltd., is also asking for permission to export gas, but details of the company's application have not been disclosed.

•

Almos Gas Gathering System, Ltd., in Bee and Live Oak Counties, Texas, has just been tied into the United Gas Pipe Line Co. transmission system.

The Almos system serves the Southwest Sliva and Licke fields in Bee County, and part of the Cornelius field in Live Oak County. It will be extended soon to tie into the west part of the Cornelius field.

•

The Federal Power Commission practice of granting temporary certificates for natural gas pipelines is coming under attack from the National Coal Assn.

NCA says FPC has "abused its discretion" repeatedly by authorizing natural gas lines "without proper notice or hearing."

•

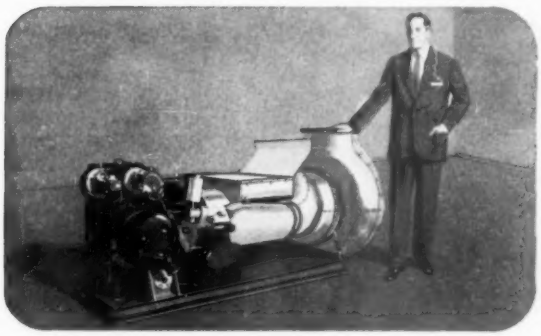
The Texas Co. plans to double the capacity of its LPG storage cavern in the Sour Lake (Tex.) field, to hold 350,000 bbl.

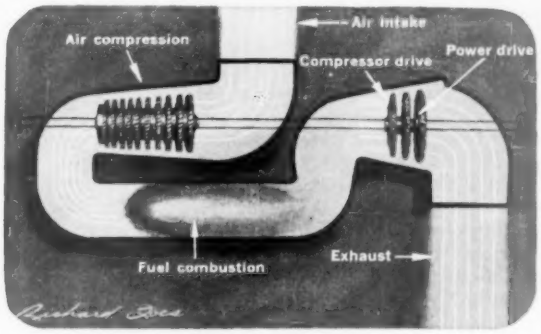
Work has just begun on the four-month job of washing out additional storage space in the field's salt dome.

Remarkable Advantages of Solar Marine Gas Turbine Engines!

❶ Instant acceleration! Greater Speed!

Fast, dependable Solar turbines are setting new standards of performance and reliability in marine propulsion. One of the most powerful engines for its size in the world, Solar's 500 horsepower Jupiter® reaches full propeller rpm from cold start in a matter of seconds, accepts maximum load without laboring or harm to engine. And boats powered by husky Jupiter turbines show vastly increased speeds over comparable boats with conventional engines.





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The basic Jupiter engine weighs about 700 pounds, or less than 1/6 the weight of marine diesels of similar horsepower! This weight saving means lighter boats.

❸ Small size—low silhouette

Solar's Jupiter engine occupies 71 cubic feet, a diesel of similar horsepower 233 cubic feet. The engine's low silhouette gives greater design flexibility.

❹ Uses any fuel

Solar turbines operate efficiently on almost any type of fuel, including low-cost diesel fuels. This fuel versatility greatly minimizes cost and supply problems.

❺ Completely vibration free

Because gas turbines are of rotating rather than reciprocating design, there is no laboring under full load. Sound level is low, even during fast acceleration.

❻ Simple design—few moving parts for low maintenance

Gas turbines are the simplest of all heat engines. Overhauls are infrequent and routine servicing can be completed in a few hours. Parts are easily interchanged and are available for off-the-shelf delivery.

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Betancourt Bars Politics in Oil

CARACAS—Venezuela's president-elect Romulo Betancourt will appoint a National Petroleum Council to advise on oil policy, with the aim of keeping oil out of politics during his five-year term. The newly elected Congress will meet in January to decide the inauguration date.

"Oil policy must not become the property of any political group," Betancourt told a press conference last week after the election had been conceded by his opponents, Rear Admiral Wolfgang Larrazabal and Rafael Calder (PW—Oct.31'58,p28).

For this reason, Betancourt said, the new oil-policy advisory board will include representatives of all major political parties—excluding Communists—as well as business and civic groups. Betancourt himself heads the Accion Democratica party, which was last in power in 1945-48. He was president for most of that period.

Betancourt last week reiterated his intention of hiking oil company taxes. But the question of a new profit-split formula, he said, will be decided only after study, on a businesslike, non-political basis.

Over a decade ago, Betancourt gave final shape to Venezuela's 50-50 profit-sharing formula. Last week he repeated his recent opinion that profits are too high in the oil industry—which he likens to a public utility.

During the election campaign, however, Betancourt had warned that any tax increases must take account of Venezuela's competitive position, to avoid pricing its oil out of international markets.

Venezuela may follow Argentina's lead in contracting with foreign companies for exploration and development of new acreage, Betancourt indicated. But "not another centimeter of national territory will be granted under the obsolete and colonial system of concessions," he said—in emphatic repetition of his campaign vow to grant no more oil concessions.

The proposed Venezuelan oil company should explore and develop oil on its own account, as well as by contract with foreign firms, Betancourt said.

As originally proposed—by other parties as well as by Betancourt's AD—this company would be government-controlled, though possibly including private capital. It would operate on areas outside existing concessions.

President-elect Romulo Betancourt.

The president-elect last week also repeated promises to increase government refining, and to enter into domestic oil marketing.

The government, he indicated, should either expand its 3,000 b/d refinery at Moron or build a new one.

During the campaign, Betancourt had proposed a government monopoly of products distribution in Venezuela.

Oil men in Venezuela are taking a wait-and-see attitude on Betancourt's policies. Some say they prefer the prospect of dealing with him on oil matters than with either of his defeated opponents.

Oil companies' relations with Betancourt had improved considerably toward the end of his previous administration. And Betancourt himself says he always found the companies ready for reasonable discussion of problems.

Further, some people believe that the one-time firebrand has mellowed while studying the Venezuelan economy in his ten years of exile in the U.S., Puerto Rico, and Costa Rica.

From the oil companies' standpoint, the proposed tax hike is the most important aspect of Betancourt's program.

The concern of the smaller producers is whether tax increases will take account of their different situation as compared with that of the major operators in Venezuela.

In general, Betancourt is expected to adopt moderate policies on oil and other questions, to avoid the bitter opposition that led to the overthrow of the last Accion Democratica government by the military, in 1948.

Venezuela has a traditionally strong executive power. But Betancourt will invite all political factions as well as independents into his government. He said he would exclude the Communists, whom he attacked strongly in his campaign.

With complete election returns not yet tabulated, it appeared last week that Betancourt's AD will probably lack a majority in the lower house of Congress, and will need support from the other parties.

The Communists, who were supporting Union Republicana Democratica candidate Larrazabal—on their own ticket—collected independent votes for a surprising 17% of the Caracas total. But over-all, they got only 6% of the votes, and less in oil areas. Opinion in Caracas is that Larrazabal may have lost as many votes as he gained by accepting Communist support in his close race with Betancourt.

It was oil worker votes that turned the tide to Betancourt. Betancourt himself says he foresees no wave of strikes ahead in the oil unions. These are largely controlled by the AD. Labor leaders had previously agreed to respect contracts running to September, 1959.

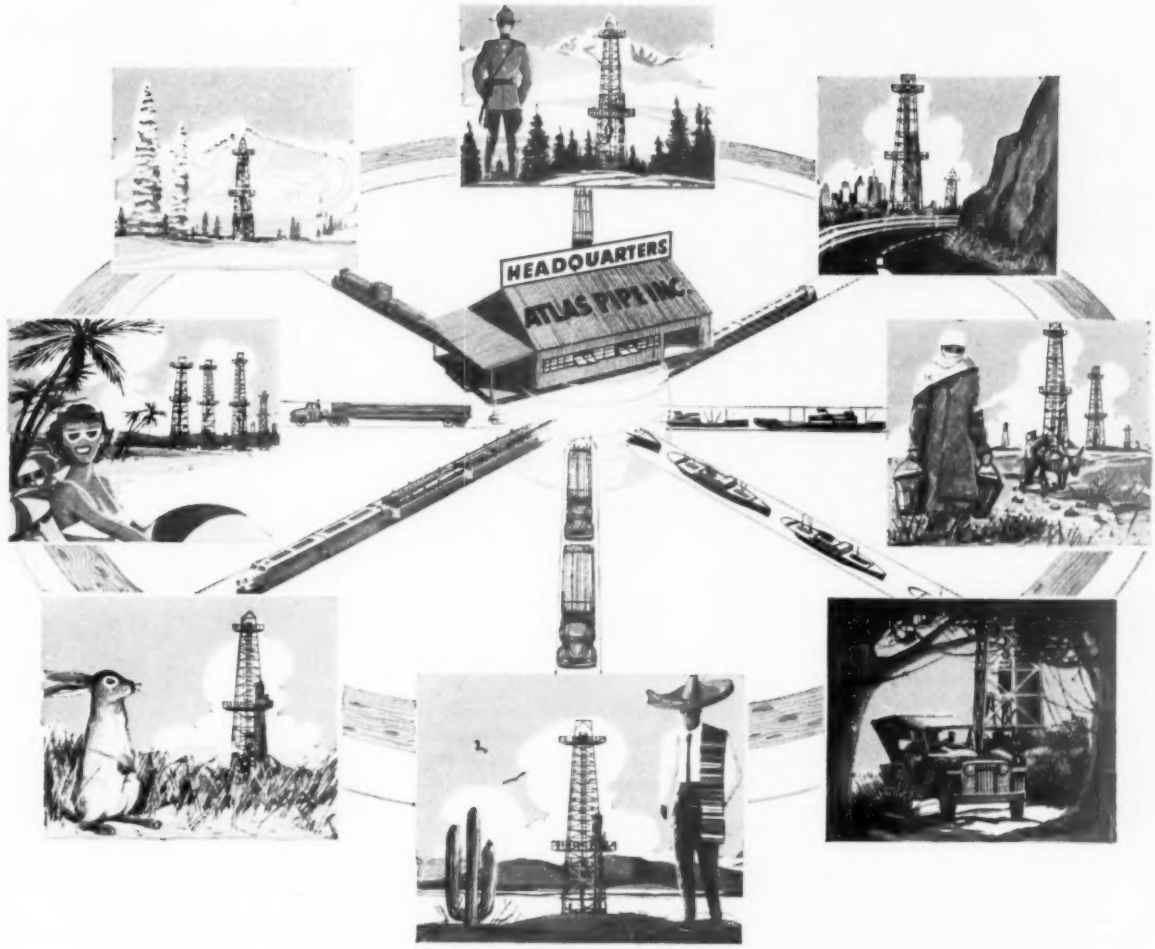
Brazil Plans Second New Refinery

SAO PAULO—Brazil's state-owned Petrobras, now building a 90,000 b/d refinery near Rio, says it plans to start work early next year on a second new plant, with capacity of 25,000 b/d to 30,000 b/d, near Belo Horizonte, capital of Minas Gerais state.

Petrobras has not yet called for bids to build the plant; nor has it yet selected the exact site.

The project has been under study for some time. Apparently due to political pressure, an alternative plan to build a pipeline from the new Rio refinery to Belo Horizonte has now been shelved.

Meanwhile, the long-term crude supply for the Rio refinery is still uncertain.



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New Abadan Line to Bypass Iraq?

The Iranian government is forming a plan to export products from the Abadan refinery through a new route that would bypass Iraqi-held waters.

Though the plan has not yet been worked out in detail, National Iranian Oil Co. has already announced it will invite international tenders by next February for construction of the new facilities at a Persian Gulf site 5½ mi. west of the port of Shahpur.

The project includes construction of a 25-mi. products pipeline from Abadan, with about 310,000 b/d capacity. The new port would include tankage, oil and cargo jetties, and other facilities.

The proposed terminal would replace the international Consortium's product-export facilities at Abadan, which is 30 mi. up the Iraqi-controlled Shatt-al-Arab River. It would not affect crude oil exports, currently all loaded at the Consortium's Bandar Mashur terminal, east of the proposed new installation.

One reason for the plan is Iraq's refusal to date to share revenues from the Abadan oil traffic with Iran.

Boundaries and navigation rights in the Shatt-al-Arab River have long been a bone of contention between the two countries.

Iran claims that Iraq's new regime, like past Iraqi governments, has failed to implement a 1937 agreement under which administration of and revenues from river traffic were to be shared jointly. Instead, traffic has remained entirely under the control of the Iraqi government's Basrah Port Authority—which also "monopolizes" the revenues.

An Iranian commission recently set up to study the question estimates that the Basrah Port Authority has been collecting $6-million to $20-million annually from tankers calling at Abadan.

Part of the stated purpose of the new port plan is political: to eliminate Iraq's virtual control over Iran's only outlet for exports from Abadan, which average about 314,000 b/d.

Both the Suez crisis and the recent revolt in Iraq—during which Shatt-al-Arab shipping was briefly closed down—have aroused the Iranians' anxiety about the security of their oil flow.

A hostile regime in Iraq, they fear, could easily seal off Abadan exports, by sinking a vessel at the mouth of the river, to strike at Iran's economy.

The government commission, however, does not propose that Iran abandon its commercial port of Khorramshahr, farther up the Shatt-al-Arab River from Abadan. The Iranians feel that Iraq would be more "reasonable" about reaching a settlement on other commercial traffic once it no longer held a stranglehold on any Iranian oil exports.

Iran and Iraq, meanwhile, are holding informal discussions through London to define their common offshore boundary in the Persian Gulf. Some agreement is essential, in view of Iran's recent grant of new oil rights at the head of the Perisan Gulf adjoining Iraq. Also, Iraq may soon offer offshore oil rights to new companies (page 15).

An amicable boundary settlement could conceivably result in Iran's shelving the plan to move its oil shipping out of the Shatt-al-Arab.

The Iranian government says the new terminal would offer economic advantages to the Consortium member companies, as well as to Iran.

The new port, unlike Abadan, would be able to handle tankers over 18,000 tons. Also, turn-around time would be considerably shorter.

Though "outside" financing apparently will be sought, the Consortium will not be asked to participate in the capital costs, by specific stipulation of the Shah.

The commission proposes that Iran secure as much outside financing as possible from such sources as contracting firms and banking interests, for long-term repayment out of port revenues.

As a very rough preliminary estimate, the commission figures the cost of the new terminal might run as high as $85-million to $112-million. A more accurate estimate will be made after details of installations that would be required are furnished by the Consortium companies to technical missions that will draw up firm plans.

At this point, Iran foresees construction of the port in stages, with the first tanker jetty in operation in three years.

The plan is non-Arab Iran's second gesture to dissociate its oil export routes from its Arab neighbors. It has already gone through the motions of concluding a pipeline transit agreement with non-Arab Turkey. This would permit construction of a major $500-million crude pipeline from northern Iran to a Turkish port, bypassing Iraq and all other Arab countries.

Flood Season Drilling Planned

CARACAS—The first attempt at year-round exploratory drilling in the remote flood plains of Barinas, in southwest Venezuela, will be started in January on Block 26, when King-Mill Oil Co. C. A. spuds its first deep test.

The company, a newcomer to Venezuela, plans two wildcats on the 49,420-acre Barinas concession, for which it paid $4.2-million in bonuses in 1957.

Equipment and supplies are now being moved in to start drilling on the block, in an area that is isolated by floods for six to eight months of the year.

All supplies must be moved in overland by April, when the rainy season starts. Personnel, food, and replacement parts will be flown in to an airstrip to be built on the concession.

The year-round drilling attempt will be made because of the three-year time limit for evaluating the new exploratory lease.

Seismograph work has been completed on Block 26, as well as on King-Mill's 24,562-acre Rio de Oro acreage, an "obligatory" concession along the Colombian border, in Zulia state.

King-Mill was formed for the Venezuelan venture by U.S. textile interests. Operator of its concessions is Deering-Milliken & Co., Inc., a firm with varied textile, oil, and other interests.

Actual operations in Venezuela are being organized and directed by Martin, Sykes & Associates C.A., a Caracas-based international oil consultant firm. The drilling contractor is Perforaciones Caribe, which has moved a new diesel-electric rig into Barinas from eastern Venezuela.

To date, King-Mill has built some 15 mi. of roads within Block 26, as well as a cut-off from the Barinas-Pedraza-Santa Barbara road. The latter is the only access to new concession areas southwest of the Barinas state capital. Some 60 mi. of this road are being jointly improved by five oil companies operating in the area.

What's New / AROUND THE WORLD

IRAQ—The government is considering reorganizing its oil department, which will "take over management" of areas to be relinquished by Iraq Petroleum Co. (page 15).

According to Minister of Economy Ibrahim Kubbah, the Directorate-General of Petroleum Affairs would be reorganized along the lines of Cairo's General Petroleum Authority. Concessions will still be granted to foreign oil companies, but will be subject to increased control.

•

PANAMA—Panamanian Delhi expects to start wildcatting early next year in the Darien area of southeastern Panama, where it has been doing exploratory work for the past year.

According to manager Frank Green, the first deep test will probably be started in February in the Chucunaque River basin.

•

BRAZIL—The state-owned Petrobras will buy up to $15-million worth of Italian oil equipment under a firm financing contract with Soc. Finanziaria Meccanica, an Italian government firm.

Petrobras may buy any type of equipment desired, paying 20% within the first two years after shipment, and 80% in the following three years.

•

IRAN—Helicopters will be used in Middle East pipe-laying operations for the first time when construction gets under way this month on the 90-mi. Gach Saran-Kharg Island pipeline.

The International Consortium has ordered two helicopters in London to help shorten the time needed to complete the new pipeline.

The Consortium also awarded a contract for the submarine section of the line—a 23-mi. segment to Kharg Island, in the Persian Gulf—to Welding Supervision Ltd., London.

•

NIGERIA—A Dutch-built submersible drilling barge will be delivered to Shell-BP Development Co. early in 1959 for work in the coastal swamps here.

The unit, which will be able to drill to 14,000 ft., can be used in inland waters with depths as shallow as 20 ft.

•

WEST GERMANY—Deutsche Erdoel AG. has completed expansion of its 16,000 b/d Heide refinery to 30,000 b/d.

Throughput in 1959 will be held to 24,000 b/d, with full utilization of capacity coming later.

•

MOROCCO—The first 75,000 bbl. of Soviet crude has been delivered here under a recent crude and oil products agreement with Russia. The Italian tanker, Drepanum, unloaded the 10,000-metric-ton shipment at Casablanca.

•

AUSTRALIA—A half-interest in 12-million acres of oil and gas rights in Queensland's Great Artesian Basin has been acquired by Cordillera Mining Co., an exploration firm based in Grand Junction, Colo., and Dallas.

Cordillera will be the operating partner on the properties, held jointly with Australian-American Oil Pty.

•

AUSTRIA—Three Communist-bloc countries are competing for any part of the Austrian fuel oil market they can get, while the domestic industry, with a surplus on its hands, is demanding a heavy protective tariff.

Hungary and Rumania have offered to cut prices by $10 per metric ton on future orders. And the Soviet Union, which has just added fuel oil to the 1959 Austro-Soviet trade list, announced it would pay Austrian customs fees from its own funds.

•

MEXICO—The projected pipeline financing loan from three U.S. banks may go as high as $60-million, Petroleos Mexicanos disclosed last week (PW—Jun.27'58,p54).

About $40-million will probably go to the major 470-mi. natural gas line from Tabasco to Mexico City.

A government team will go to the U.S. to conclude negotiations with Chase Manhattan Bank, Bank of America, and Chemical Corn Exchange Bank.

•

AUSTRIA—Western oil firms will face stiffer domestic marketing competition next year from state-owned companies.

Two existing oil distributing and marketing firms will be merged and expanded. The new emphasis on domestic sales is due to the projected completion of a 52,000 b/d government refinery in 1961.

•

FRANCE—An oil and gas conservation authority for France and the French Sahara was set up by decree last week. It will collect and distribute data on exploration, and coordinate supervision of production.

Seven Firms Share Oil Contract Areas

Seven foreign companies—all but one from the U.S.—are now set to participate in Argentina's oil development program, following award of the latest contract areas to Esso and Royal Dutch Shell (PW—Dec.12'58,p12).

Esso's is a 1,850-sq. mi. semiproved tract in Neuquen (1). Shell's is an unproved 11,500-sq. mi. area in the Rio Negro region (2).

Also in the picture now are Signal Oil & Gas Co. and Union Oil & Gas Co. of Louisiana, which have acquired 20% and 16⅔% interests, respectively, in the Carl M. Loeb, Rhoades & Co. contract area (5).

The other areas were granted to Union Oil Co. of California (3) and Pan American International Oil Co. (4), which is preparing to start drilling.

Greaseless bearings for autos . . .

A Serious Blow—but not Fatal

Oil marketers are taking calmly the announcement that at least one 1960 car will have no grease fittings, even though the development arrived sooner than expected.

Grease sales officials weren't voicing much surprise last week when American Metal Products Co. announced that it had developed a nonlubricated fabric bearing (PW—Dec.12'58,p36). Ford Motor Co. will probably use the bearing on its new small car and on its Thunderbird. General Motors and Chrysler have been working to eliminate chassis lube fittings also, and are expected to achieve this on some 1960 models.

Oil companies have long been prepared, psychologically, for the advent of the frictionless bearing and the resultant "sorry" grease market (PW—Oct.31'58,p36). Most observers had felt that the development was still three to five years away, however.

There has been almost unanimous agreement among oil marketers that, once somebody makes the breakthrough, the highly competitive auto industry will take "no longer than two years" to eliminate grease fittings from all new cars. The fact that this break-through appears to be coming a year or so ahead of earlier predictions doesn't seem to make too much difference in the sales outlook, which is a pretty gloomy one anyway.

Sales chiefs in lubricants departments refuse to get excited until they see: (1) proof that the new bearings actually work, and (2) whether or not the "greased for life" auto is economical.

American Metal says its fabric bearings have been tested for 90,000 mi. in autos and shown no sign of wear. But grease experts aren't convinced yet. They point to other attempts to use frictionless bearings, which weren't as successful as they were expected to be.

"During the war, one car had so-called self-lubricating bearings," says one grease sales official. "But people didn't trade in their cars after 50,000 mi. during the war—and the bearings on that car didn't hold up. A truck company recently tried nylon bearings in some of its trailers. Now it's having to lubricate them with premium-grade grease.

"The frictionless bearing won't hold up under heavy driving. I doubt whether such bearings would be practical, for instance, in a taxi that puts on 100,000 mi. of hard driving in a year."

Other observers feel that the cost of putting the self-lubricating bearing in new cars may more than offset the merchandising appeal of a "greased-for-life" auto.

"These bearings may turn out to be more expensive," observes one man, "and not entirely justified. A grease job isn't that expensive. Manufacturers may decide not to use self-lubricating bearings on some of the new cars."

American Metal says, however, that it can produce the new bearings at a cost competitive with conventional bearings.

Growing industrial markets are expected to compensate at least in part for the sharp dip in automotive grease sales.

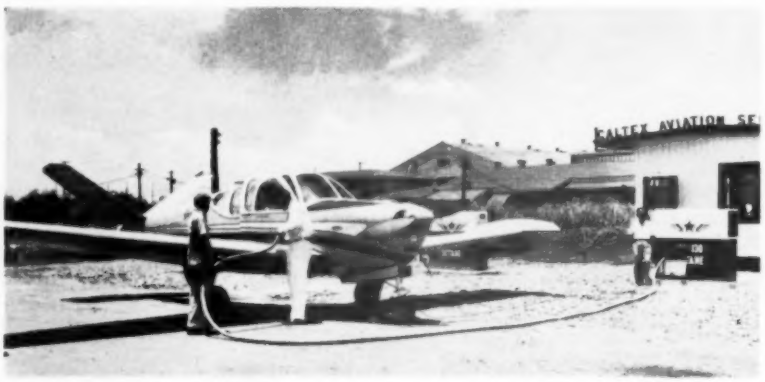
Most industry estimates place automotive grease sales today at somewhere between 40% and 50% of total grease sales. There will still be a big market in heavy industry, farm machinery, trucks, buses, and the millions of cars already on the road that do have chassis fittings.

As one lube sales official put it, "We'll be selling grease for a long time."

How long will it take for the real impact of the frictionless bearing to be felt in grease sales? Oil marketers are now saying "five, six, perhaps seven years"—but they aren't sure.

In the long run, however, oil's automotive experts admit that technology could "play hell with the grease market." Small independents will be hit hardest, some say, especially those who've concentrated on automotive sales.

A recent estimate predicted a 48% decline in automotive grease sales by 1965, and a 67% decline in grease consumption by passenger cars. These estimates—by W. M. Drout, Jr., manager of marketing economics for Esso Standard Oil Co.—were based on the assumption that grease fittings



Brewery Helps Caltex Fuel Record Flight

When Caltex (Philippines) Inc., took on the job of fueling a single-engine craft for a record-breaking nonstop oceanic flight, some offbeat problems came up.

The flight from Manila to Pendleton, Ore., in a Bonanza J-35 by M. L. (Pat) Boling set a new record of 7,000 mi. nonstop over water by a single-engine plane.

Caltex used dry ice and a truck—supplied by a nearby brewery—to cool the high-octane aviation fuel. This boosted total fuel capacity from 402 to 430 gal.

The fueling job and takeoff had to be timed just right so the first part of the flight, from Manila to Tokyo, would be flown between typhoons.

Just as fueling was ready to begin, something went wrong with the power unit, and the pump wouldn't work. Fortunately, a film company hired to take movies of the takeoff had a 2-kw. generator on its sound truck. This was borrowed to pump the fuel into the plane's tanks.

would be eliminated on all new cars by 1963, possibly sooner.

The average interval between passenger-car grease jobs is being stretched out also, which further reduces the sales potential. Drout predicts a 2,700-mi. interval by 1965.

There are other oil economists who forecast a less gloomy sales picture for grease than Drout does. But it's mostly a matter of degree.

"It doesn't take much brains," says one forecaster, "to figure out that a company would be crazy to gear any new plant facilities to increased grease production."

Most marketers are hanging on to the hope that they will always sell motor oil. But they're a little worried by auto industry contentions that some day the only lube oil needed will be a factory fill.

It would cost a lot to develop a "sealed crankcase," and marketers doubt that the auto industry would be willing to pay for it.

"I don't think we'll ever see a sealed crankcase," comments one lube expert, "unless it's in a turbine engine. With a normal combustion chamber, it would be 'dirtied to death.' It would be too costly to develop the precision-built engine you'd need if you wanted to eliminate the normal drain period."

The loss of grease jobs will make TBA selling harder, too, because dealers won't have cars on the lifts—where needed replacements and repairs are easily spotted.

The impact of the self-lubricating bearing on over-all dealer revenue could be sizable, in four or five years, according to one marketer's estimates, but not much before then.

Most marketers feel that there will still be plenty of lube-bay services for the service station to perform, but that suppliers may have to help the dealer find these allied services.

An added problem for everyone: the elimination of regular auto safety checks, normally done with chassis lubrication, could be hazardous.

"You can't expect a dealer to put a car on a lift and give it a free safety check if he's not going to get any money out of it," explains one marketing official. "And that's really the only time he can see a worn muffler, a tire that's ready to go, worn bearings, and other defects.

"There may be a lot of cars falling apart because maintenance is neglected. It'll mean more 'unsafe' cars on the road.

"Furthermore it takes away the dealer's best opportunity to be a good merchant."

What's New / IN MARKETING

American Oil Co. has joined the ranks of companies reorganizing their marketing setups for greater efficiency. For Amoco, the move concentrates the administrative work of 16 division offices into four regional offices. Amoco is creating 25 district offices to take over the sales functions of the 16 division offices.

Amoco regional offices and the areas they will serve are: New York—New England, New York, New Jersey; Baltimore—Pennsylvania, Maryland, Delaware, northern West Virginia, Ohio, District of Columbia; Atlanta—Virginia, southern West Virginia, North and South Carolina, Georgia, most of Florida; and New Orleans—Kentucky, Tennessee, Arkansas, Mississippi, Alabama, western Florida, Louisiana, Houston-Galveston area.

•

Gulf Oil Corp. has set up a new supply and scheduling division in its manufacturing department to handle domestic product supply. Domestic product supply was formerly handled by a crude oil and product supply department, which will continue to handle foreign product supply.

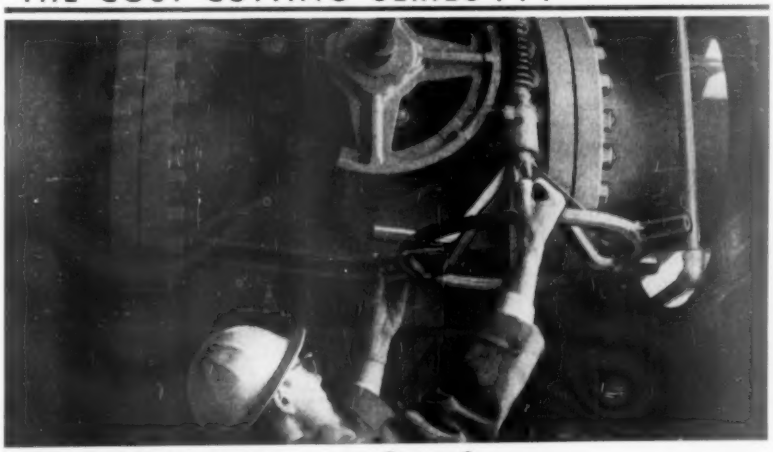
All products supplied to domestic outlets will be handled by the new division, headed by D. T. Parks, and responsible to B. R. Dorsey, administrative vice-president. The division will include a product supply section under J. N. McGarvey, and a refinery scheduling section under Z. Q. Johnson.

•

Lion Oil Co. has established nationwide credit card service through exchange agreements with other suppliers.

Lion has mailed more than 60,000 new vinyl "Credi-matic" cards, which will be honored at stations of Pure Oil Co., Tidewater Oil Co., and D-X Sunray Oil Co. Heretofore, Lion card holders had credit privileges only in the Midsouth and the Midwest.

THE COST CUTTING SERIES . . .



BIG VALVES can be fast

Lubricated plug valves, especially in the larger sizes, operate five to eight times faster than ordinary valves. On the Rockwell-Nordstrom 20″ valve above, the gearing only moves the plug through 90° for full, positive closure. Ordinary valves require hundreds of turns to set the seats. Also, the pressurized lubricant sealing that insures positive shut-off in Rockwell-Nordstrom valves eliminates metal-to-metal friction for easy, dependable operation. Since lubrication is preventive maintenance, these valves stay in service longer, cost far less to use. Rockwell-Nordstrom valves are available in a complete line of pressures and sizes. They cost no more to buy, often less, than ordinary valves. Write for more information.

ROCKWELL MANUFACTURING COMPANY
PITTSBURGH 8, PA.

The Market Place AROUND THE WORLD

Prices compiled for PETROLEUM WEEK by Platt's OILGRAM Price Service and National Petroleum News, McGraw-Hill Publications

All prices as of December 15

Bold face type indicates changes from previous week

KEY PRICES—REFINED PRODUCTS

(¢ per gal. except dollars per bbl. where $ is shown)

Western Hemisphere

U. S. Gulf Coast, cargoes
- Gasoline, 98 oct prem....11.75-12.75
- Gasoline, 92 oct reg....10.5-11.5
- Kerosine....9.375-9.875
- Heating oil, No. 2....8.875-9
- Gas oil, 48-52 d.i....9.125-9.5
- Fuel oil, bunker "C"....$2.00-2.10

Caribbean, cargoes
- Avgas, Grade 100/130....16
- Gasoline, 93 oct research prem....10.75
- Gasoline, 87 oct research reg....9.875
- Gasoline, 79 oct research....9.125
- Gasoline, 70-72 oct motor method....9
- Kerosine....9.375-9.625
- Heating oil, No. 2....8.875
- Gas oil, 48-52 d.i....9.125
- Fuel oil, bunker "C"....$2.00

New York Harbor, barges
- Kerosine....10.7
- Heating oil, No. 2....10.2
- Fuel oil, No. 6....$2.37-2.45

Okla-Group 3, northern shpt., bulk
- Gasoline, 89 oct reg....11.625-12.375
- Kerosine....10-10.5
- **Heating oil, No. 2....9†-9.5**
- Fuel oil, No. 6....$1.60-1.70

Chicago, bulk
- Gasoline, 91 oct reg....11.5
- **Heating oil, No. 2....10†-11.35**
- Fuel oil, No. 6 high sulfur....7.15-7.25

Los Angeles, rack
- Gasoline, 88 oct reg....11.75-12.6
- Diesel fuel, PS 200....10-11.25
- Light fuel, PS 300....$2.80
- Heavy fuel, PS 400....$2.15-2.35

Natural Gasoline, Grade 26-70
- FOB Group 3....4.5
- FOB Breckenridge, Tex....4

LP-Gas
- Propane, Oklahoma (Group 3)....5

Pennsylvania Lubes
- Bright stock, 25 p.t....22
- 200 vis. neutral, 25 p.t....21

Mid-Continent Lubes, Tulsa basis
- Bright stock, solvent, 95 v.i....23-24
- Neutral, solvent, 200-210 vis....19.5-20.5

Gulf Coast Lubes
- Bright stock, solvent, 95 v.i....24
- Neutral, solvent, 200 vis....20.5

Eastern Hemisphere

Singapore (Pulau Bukom), cargoes
- Avgas, grade 100/130....17.25
- Gasoline, 79 oct research....10.375
- Kerosine....10.375
- Gas oil, 48 d. i. minimum....10.25

KEY PRICES—CRUDE OIL

(2¢ differential per deg. of grav. applies except as noted)

Western Hemisphere

United States (at the well)
- Mid-Continent, 36.0-36.9....$2.77-3.07
- **North Dakota, 36.0-36.9....2.62-2.87↓**
- Texas:
  - Gulf Coast, low cold test, 26.0-26.9....3.50
  - Gulf Coast, Upper & Lower, 26.0-26.9....2.92-3.22
  - West Texas, sweet, 36.0-36.9....3.00-3.07
  - West Texas, N. M., inter., 36.0-36.9....3.00
  - West Texas, N. M., sour, 32.0-32.9....2.86
  - East Texas, flat....3.25
  - Mirando, 28.0-28.9....3.31
- Illinois Basin, flat....3.00
- Pennsylvania Grade, Bradford dist., flat....3.90
- California, Signal Hill, 21.0-21.9....2.50†
- North Louisiana-Arkansas, 36.0-36.9....2.77-3.02
- Wyoming, sweet, 36.0-36.9....2.90-3.00
- Wyoming, sour, 32.0-32.9....2.71

Canada (flat prices, at the well)
- Acheson-Stony Plain (Alta.)....$2.61
- Leduc-Woodbend (Alta.)....2.67
- Redwater (Alta.)....2.56
- Daly (Man.)....2.39
- Smiley (Sask.)....2.33

Venezuela (Cargoes, FOB lifting port designated)
- Cumarebo, 48.0-48.9, Tucupido....$3.66
- San Joaquin, 41.0-41.9, Puerto la Cruz....3.25
- Oficina, 35.0-35.9, Puerto la Cruz....3.05
- Tia Juana, Medium, 26.0-26.9, Amuay....2.55
- Bachaquero, flat, Las Piedras....1.78-1.93
- Tarra, 38.0-38.9, San Lorenzo....3.08
- Lagunillas Heavy, flat, Cardon....2.10

†Differential per deg. of grav. varies.

Eastern Hemisphere

Middle East, Persian Gulf (Cargoes, FOB lifting port)
- Arabia, 34.0-34.9, Ras Tanura....$2.08
- Safaniya, 27.0-27.9, Ras Tanura....1.65
- Iran, 34.0-34.9, Bandar Mashur....2.04
- Iran, 34.0-34.9, Abadan....1.99
- Iraq, 35.0-35.9, Fao....1.98
- Kuwait, 31.0-31.9, Mina-al-Ahmadi....1.85
- Qatar, 41.0-41.9, Umm Said....2.23
- Neutral Zone, Burgham, 23.5-24.4, Mina Saud....1.61
- N. Zone, Eocene-Ratawi, 20.5-21.4, Mina Saud....1.43

Middle East, Eastern Mediterranean
- Arabian, 36.0-36.9, Sidon....$2.49
- Iraqi, 36.0-36.9, Tripoli, Banias....2.49

Far East, Cargoes, FOB Lutong, Sarawak
- Seria Light, 37-38....$2.75

KEY TANKER RATES

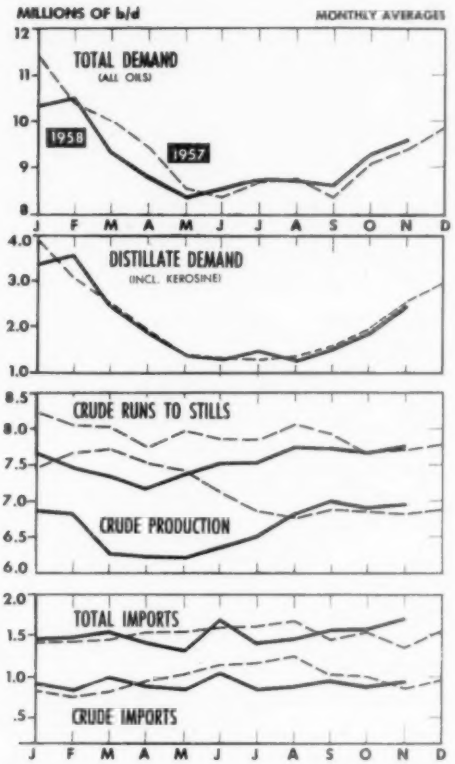
(Last paid, per long ton, single voyage)

U.S. Gulf-New York, clean (USMC —10%) $2.57↓
U.S. Gulf-New York, dirty....(USMC —20%) $2.28
NWI-USNH, dirty....(USMC —55%) $1.22
NWI-UK/Cont., dirty....(Scale —42½%) 18/8*
Persian Gulf-UK/Cont., dirty....(Scale —57½%) 26/7*
Pers. Gulf-USNH, dirty..(USMC —72½%) $3.49↓

**Sterling.*

PETROLEUM WEEK'S

Fingertip Figures



TOTAL DEMAND

Latest 4-week average	10.111
Year ago	9.759

DISTILLATE DEMAND

Latest 4-week average	2.981
Year ago	2.712

RUNS TO STILLS

Latest week	7.788
Previous week	7.666
Year ago	7.744

CRUDE PRODUCTION

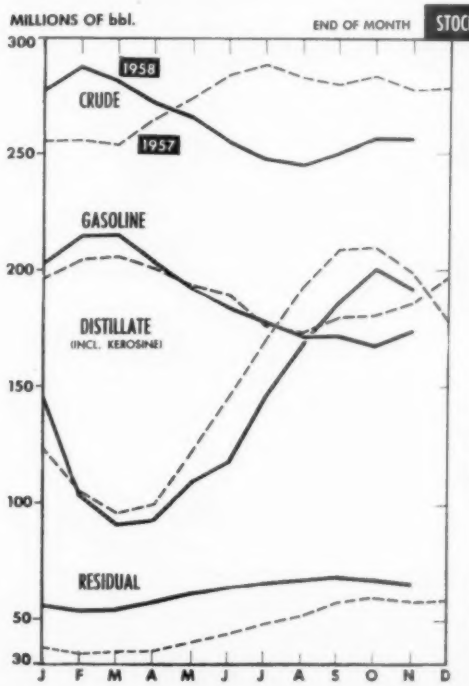
Latest week	7.097
Previous week	7.067
Year ago	6.884

TOTAL IMPORTS

Latest week	1.610
Previous week	1.726
Year ago	1.360

CRUDE IMPORTS

Latest week	.975
Previous week	1.020
Year ago	.782



CRUDE STOCKS

Week-ended 12-6	257.0
Previous week	258.3
Year ago	279.7

GASOLINE

Latest week	174.7
Previous week	174.3
Year ago	188.8

DISTILLATES

Latest week	177.7
Previous week	186.8
Year ago	189.2

RESIDUAL

Latest week	62.8
Previous week	65.1
Year ago	59.0

The weather over most of the nation this fall would indicate a healthy demand for distillates during the current heating season.

Since the start of September, temperatures have averaged 2.4% colder than normal, measured on a degree-day basis. The East Coast and the Southeast have had the highest degree-day counts, compared with "normal."

Last heating season, demand for distillates was strong in the January-March period, when temperatures generally ran below normal. But the fall temperatures in that heating season were milder than normal.

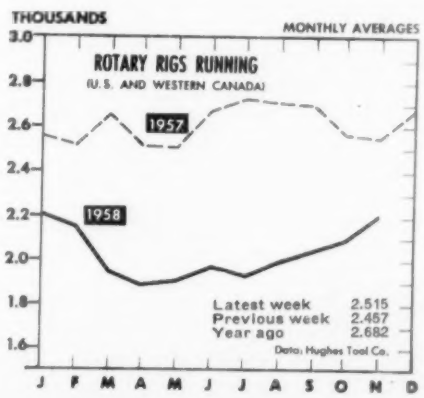
Preseason estimates placed domestic demand for distillates during the November-March period at about 8% over the previous heating season. They predicted that domestic demand for distillate fuel oil and kerosine would average about 3.1-million b/d.

Indicated domestic demand for distillates in November ran about 200,000 b/d under expectations, despite relatively cold weather over most of the nation.

But demand is measured at the primary level—shipments by refiners—and not at the point of consumption. Normally, fuel oil suppliers fill their storage prior to November. And the real impact of actual consumption in November is not noticed in demand figures until the secondary suppliers reorder in December.

Movements of distillates from primary storage, and higher prices—up 0.25¢ this week—on the Gulf Coast, tend to confirm the preseason estimates.

Withdrawals of distillates from primary stocks in the first two weeks of December totaled 15-million bbl., compared with only 10-million bbl. a year ago, and with only 5-million bbl. in November.



The Market Trend

Thompson, Sugarland, Webster...and Gabon

This week the world crude market has a new competitor to think about: Gabon crude from West Africa. Several cargoes had been test-run in France, but none had previously been seen in open competition with comparable oils on this side of the Atlantic.

The occasion was Argentina's call for low-pour-test naphthenic crude for delivery in 1959. Argentina wants four boatloads, one each in February, May, August, and November.

Gabon crude from the Ozouri field was offered by Societe des Petroles d'Afrique Equatoriale Francaise. The company promised the oil would be desalted, with water content less than 0.4%. The material is being made available f.o.b. the company's Cape Lopez terminal, 10 mi. north of Port Gentil, Gabon.

The entry of Gabon crude into the picture challenges the long-standing superiority of Texas and some Venezuela oils in world trade. Texas low-cold-test naphthenics, incidentally, are relatively high in price, running to $3.78 a bbl. for top gravities. They are nonsulfurous, and give excellent yields of Arctic diesel and specialty lubricating oils.

Gabon crude is the first low-cold-test naphthenic crude to be discovered in commercial quantities in the Eastern Hemisphere. This oil will tend to replace West Beaumont, Conroe, Webster, and other specialty crudes that still enjoy some trade with Europe.

And the Gabon price was a toughly competitive one, too. The offering stipulated $2.03 a bbl., f.o.b. seller's loading dock. This price is 79¢ a bbl. lower than the f.o.b. price quoted for Tia Juana 102 Low Pour crude, f.o.b. Amuay, Venezuela. The Gabon oil was $1.37 lower than a comparable West Central Texas offering, f.o.b. the seaboard. The Gabon oil, also, was offered for payment in French francs.

The Gabon development represents progress. But some producers on this side of the water will wince at it.

Armed Services Seek Gasoline: The Armed Services came into the market last week for 83/91 octane Combat Type gasoline, and drew 13 offers. This was not too heavy a showing, considering the season. The lowest price was quoted by Gulf Oil on approximately one cargo-lot—9.5¢ a gal., f.o.b. Port Arthur, Tex.

Oklahoma Squabble: Everybody in the Mid-Continent was in an uproar last week. With a freeze on from Chicago down to inland Texas, some refiners in Oklahoma were shading their No. 2 fuel prices from 9¢ to 8.5¢. But the year's heaviest buying to date wiped out the "undercut" offerings.

Chicago Increase: Chicago No. 2 truck prices moved up to 10¢, up 0.25¢, for the second increase so far this month. Heavy demand coupled with barging difficulties on the river helped boost the price.

Ohio Hike: Ohio Standard advanced its residual prices in varying amounts on Dec. 8. No. 5 was increased by 0.55-0.6¢; No. 6, by 0.25-0.3¢.

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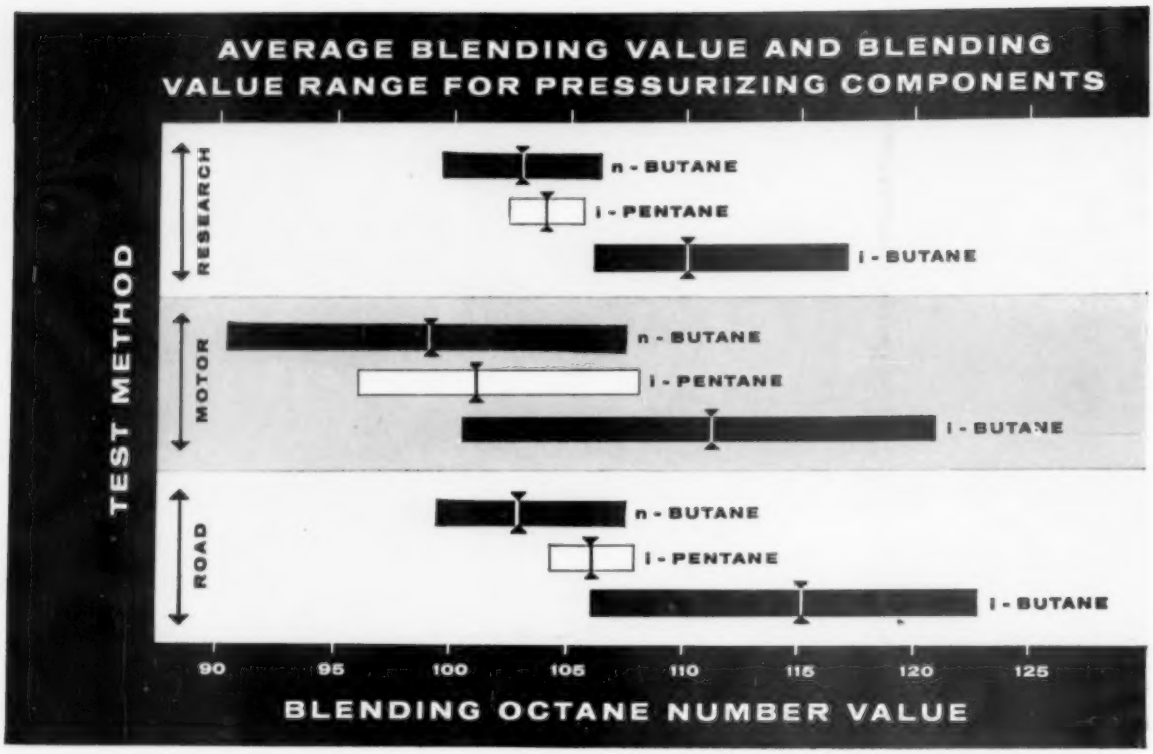


Average blending values are shown by the arrows. The length of the bar indicates the range of the blending values in the different base fuels.

Blending values of pressurizing agents in tomorrow's gasolines and engines

BY J. J. GREYTAK

The Du Pont Petroleum Laboratory has recently completed a significant road and laboratory study of the blending value of pressurizing agents. The results are particularly important because they were obtained with high octane stocks in high compression ratio cars.

The vapor pressure control materials studied in the tests were n-Butane, iso-Butane, and iso-Pentane.

Several typical fuels were made up from combinations of light and full-range cat-cracked stocks; C_5 and C_7 plus reformates; a thermally cracked reformate; an aromatic extract and an aviation quality alkylate.

The blends were treated with the three pressurizing agents and rated both in the laboratory and on the road. Road ratings were conducted in three 12:1 compression ratio cars. All finished blends contained 3 cc. of tetraethyl lead per gallon.

This table shows the average octane blending values of the three pressurizing agents:

OCTANE NUMBER	AVERAGE BLENDING VALUES		
	n-Butane	iso-Pentane	iso-Butane
Research ...	103	104	110
Motor	99	102	111
Road	103	106	115

Although i-Butane is shown to have the highest octane blending value of the three pressurizing agents, the amount that can be used in a commercial gasoline is limited by its high vapor pressure. Consideration of both volatility and octane blending values for the three vapor pressure control materials, leads to the conclusion that more gasolines of higher octane number can be made using i-Pentane than by using either of the butanes.

The exact quantities of iso-Pentane which should be employed will be determined by the amounts available as well as by the over-all refinery processing schemes.

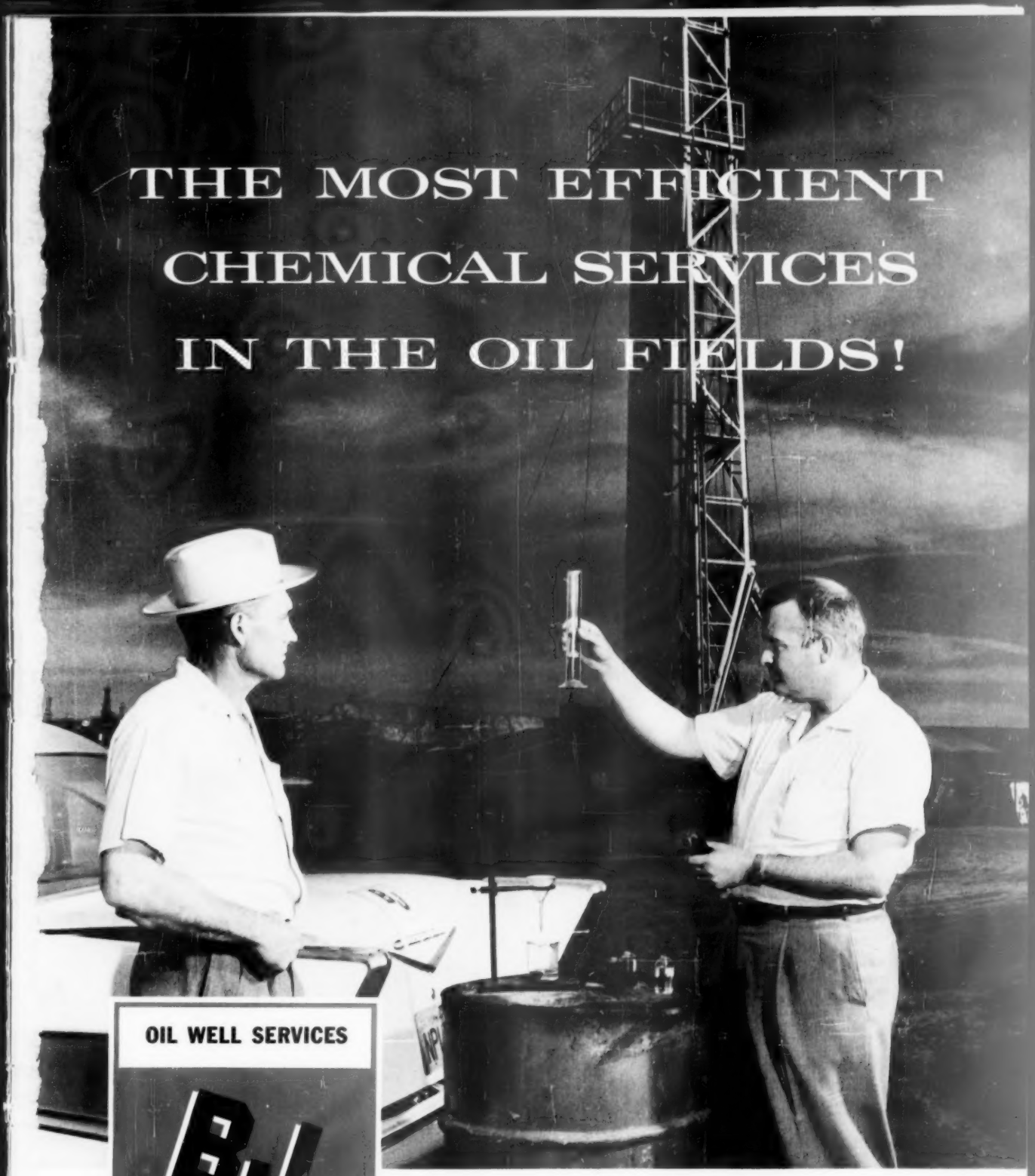
In addition to the above, the investigations provided information on the influence of the base fuel compositions. For example, it was found that the Motor Method blending values of n-Butane and iso-Pentane were highest in fuels containing alkylate.

Further detailed information regarding this program is available upon request. E. I. du Pont de Nemours & Co. (Inc.), Petroleum Chemicals Division, Wilmington 98, Delaware.

JOHN J. GREYTAK is an engineer in the road antiknock group at the Du Pont Petroleum Laboratory. He is co-author of the paper "Road Octane Numbers of Tomorrow's Gasolines in Tomorrow's Cars" which he presented at the API Refinery Meeting in May 1957.

DU PONT
REG. U.S. PAT. OFF.
Better Things for Better Living
. . . through Chemistry

Tetraethyl Lead
and other
Petroleum Additives



OIL WELL SERVICES

BJ Service

A BORG-WARNER SUBSIDIARY

- Acid Treating Solutions
- Temporary Blocking Materials
- Permanent Blocking Materials
- Water Block Removal Agents
- Emulsion Block Removal Agents

(Details on reverse side)

BJ SERVICE

Leader in More Effective Chemical Services since 1932

From the inception of oil well acidizing in 1932, BJ Service has led the way in well stimulation procedures. BJ leads in experienced manpower—in field-proven personnel with an intimate knowledge of the right treating techniques for *your* area. BJ leads in treating solutions and methods—developed by continuing laboratory and field-testing programs to answer every down-hole need. BJ leads in equipment—designed and built in our own manufacturing division for one job, one trip service. And BJ leads in availability, with a network of strategically located field stations in every major oil field area. It's this combination that has given BJ Service its reputation for the "most effective chemical services in the oil fields." If you're interested in *results*, call BJ Service for your next well stimulation job.

Chemical Services Laboratory, where BJ SERVICE maintains its 26-year leadership in advanced new treating solutions and techniques.

MUD-SOL

A patented well-treating solution designed to remove drilling mud and filter cake from the well bore and adjacent areas. Especially recommended for use in formations that are relatively insoluble in hydrochloric acid.

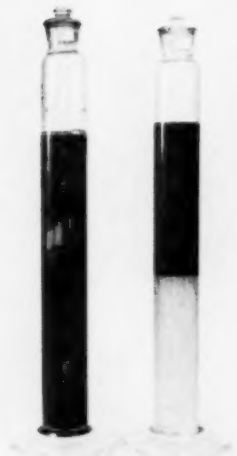
CLEANUP ACID

Inhibited 5% or 15% hydrochloric acid with special additives. Acts to dissolve carbonates, loosen and disperse filter cake solids and increase permeability of any filter cake materials remaining in the formation. Recommended for use as a "spearhead" before fracturing treatments.

ATPET 277

A water block removal agent, added to kerosene, crude or diesel oil, that causes the blocking water to become emulsified in oil. This effects the necessary change in surface tension and allows the fluid to flow freely from the well.

Proof of demulsifying properties of J-Type Acid. J-Type Acid (right) has completely fallen out of oil. Regular acid solution (left) is still emulsified.



J-TYPE ACID

Inhibited hydrochloric acid with surfactants to lower surface and interfacial tension and prevent formation of emulsions. Used in treatment of carbonate reservoirs to increase permeability, leave drainage channels free of emulsion and to clean up in the shortest possible time.

GELLED ACID W

A viscous acid-kerosene emulsion characterized by low fluid loss and high viscosity. Designed to penetrate farther into the formation and to penetrate oil-bearing formations more easily than water-bearing formations. Demulsifiers may be added for J-Type Gelled Acid W.

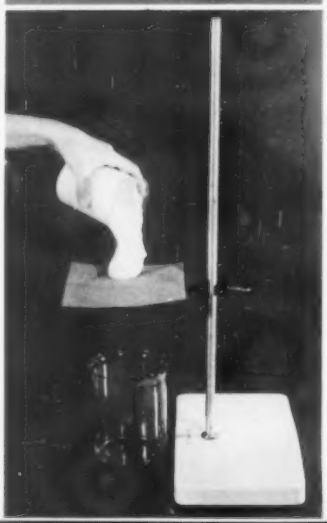
J-10

An oil soluble emulsion breaker. Changes the existing surface tension relationship between the fluid and the rock, breaking most emulsions found in producing formations. Can also be employed as a spearhead preceding acidizing or fracturing treatments.

FORMJEL

A metallic soap kerosene gel used to temporarily block off one zone from a few hours up to 12 days while treating a less permeable zone. Seals leaking packers and stops communication between perforated intervals during stimulation. Can be used with bottom-hole temperatures up to 200°F.

Dramatic illustration of high viscosity of Formjel in its gelled state. Formjel is one of several blocking agents available from BJ SERVICE.



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FIRMJEL

Permanent blocking material of very high viscosity, designed to correct gas/oil ratios in wells with open hole or perforated completions. Contains fluids in the formation for long periods of time, yet will not prevent packers from being pulled.

SELECTOJEL

A viscous oil base gel containing selected graded-to-size granular materials. Used to temporarily block zones opened before or during stimulation, forcing acid or frac fluid to penetrate new zones. Remains in pumpable condition throughout treatment.

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J. W. Kerr

C. S. Coates

JAMES W. KERR was elected president and chief executive officer of Trans-Canada Pipe Lines, Ltd., Toronto, succeeding **CHARLES S. COATES,** who is the new chairman. Coates succeeds **N. E. Tanner,** who continues as a Trans-Canada director. Kerr was most recently vice-president and general manager of Canadian Westinghouse Co.'s apparatus products group.

DR. MICHAEL J. RZASA is the new manager of research laboratories for Cities Service Research & Development Co., with headquarters in New York. He has been manager of the Cities Service Product Development Laboratory, at Cranbury, N. J., since 1957. As manager of research laboratories, Rzasa will supervise all Cities Service labs, including those in Tulsa, Lake Charles, La., and Cranbury.

GEORGES VORBE has been transferred to Paris, France, as geological counsel to the Eastern Hemisphere subsidiaries of D. D. Feldman, Oil & Gas. Vorbe was most recently Feldman's chief research geologist in Dallas, and, before that, was on a two-year assignment for Feldman in Cuba.

EUGENE D. SMITH was promoted from assistant advertising manager to advertising manager of Lion Oil Co., El Dorado, Ark. Smith succeeds **Clarence R. Olson,** who will remain with the company as consultant in matters pertaining to advertising and sales promotion.

GEORGE H. FENTRESS has joined Exeter Drilling Co., Denver, in the new position of manager of exploration operations in the Denver Basin and Rocky Mountain area. He was most recently associated with Baumgartner Oil Co., Denver, as manager of exploration and production in the same areas.

JOHN E. SPRINGER, Tidewater Oil Co., Midland, Tex., is chairman of the Natural Gasoline Assn. of America's Permian Basin chapter, first regional chapter of NGAA to be established. **E. T. Catham,** Atlantic Refining Co., Midland, is vice-chairman, and **H. L. Hensley,** Humble Oil & Refining Co., Midland, is secretary-treasurer. Eight members of the regional chapter's executive committee are: **J. L. Hackney,** Humble Oil & Refining Co., Midland; **Charles Sweeney,** Reef Fields Gasoline Co., Big Spring, Tex.; **E. R. Wagner,** Pan American Petroleum Corp., North Cowden, Tex.; **J. L. Brown,** Shell Oil Co., Midland; **Meade Corley,** Phillips Petroleum Co., Odessa, Tex.; **Earl Palmer,** Atlantic Refining Co., Lovington, N. M.; **Jack Jamison,** Superior Oil Co., Midland; and **G. E. Kendrick,** El Paso Natural Gas Co., Jal, N. M.

JERRY McAFEE, vice-president of Gulf Oil Corp., Pittsburgh, was elected 1959 vice-president of the American Institute of Chemical Engineers, at the institute's annual meeting. Directors of the institute, elected for a three-year period, include **W. B. Franklin,** head of the technical service division of Humble Oil & Refining Co., Baytown, Tex., and **L. C. Kemp, Jr.,** vice-president of The Texas Co., New York.

FRANK M. PORTER, president of the American Petroleum Institute and of Fain-Porter Drilling Co., Oklahoma City, has been elected an advisory director of the Chemical Corn Exchange Bank, New York. Porter, president of API since 1950, will be a member of Chemical's Rockefeller Center advisory board.

C. H. COUGHLIN, northern sales region manager of Standard Oil Co. (Ind.), in Milwaukee, will become general manager of sales for American Oil Co., New York, on Jan. 1. Coughlin succeeds **J. N. Carney,** who is retiring after 34 years with the Indiana Standard subsidiary. **Guy D. Carroll,** sales promotion manager at Indiana Standard's general office in Chicago, succeeds Coughlin.

C. H. Coughlin

M. L. Haider

MICHAEL L. HAIDER, formerly president of International Petroleum Co., Ltd., Coral Gables, Fla., has been elected a director of Standard Oil Co. (N. J.). At the same time, **Hines H. Baker** resigned as a director and member of the Jersey executive committee. Haider has been president of International Petroleum, a Jersey affiliate whose principal activities are in Colombia, Peru, and Venezuela, since 1954. Before that, he was head of the producing and exploration department, vice-president, and a director of Imperial Oil Ltd., Jersey's Canadian affiliate.

FRED P. SEWELL, vice-president of manufacturing and marketing for Delhi-Taylor Oil Corp., and his assistant, **Carroll C. Cook,** have moved to the company's main offices, in Dallas. Both men were formerly located at the company's Corpus Christi refinery. The manufacturing headquarters were moved to centralize the company's key executives in Dallas.

ROBERT H. ROWLAND has been named manager of the Hawaiian refinery of Standard Oil Co. of California, Western Operations, Inc., now under construction in Honolulu. Rowland joined California Standard in 1938, at its Richmond (Calif.) refinery. In 1947 he was named superintendent of the Perth Amboy (N.J.) refinery of California Oil Co. a California Standard subsidiary, and in 1950 was named manager there. He returned to Standard's home office in San Francisco in 1958. While the Honolulu refinery is under construction, Rowland will divide his time between California and Hawaii. After the first year of engineering work is completed, he will move to Honolulu.

R. H. Rowland

W. M. Kluss

WILFRED M. KLUSS is the new assistant to the general manager of Socony Mobil Oil Co.'s marine transportation department, in New York. Kluss previously served as senior area executive in the department of Middle Eastern affairs. He came to Socony from the International Bank for Reconstruction & Development.

A. F. LORTON, JR., became head of Gulf Oil Corp.'s public relations activities in the South and West on Dec. 1. Lorton succeeds the retiring Don Riddle, in the company's Houston headquarters. Lorton was most recently associated with **James A. Clark,** oil and gas writer, in Houston. Before that, he was director of public relations for Pacific Northwest Pipeline Corp., Salt Lake City.

RICHARD MARSHALL is the new manager of the southern region for Wilshire Oil Co. of California, a newly created position. Marshall will be responsible for all distributor, wholesale, retail, and commercial sales in Southern California, with the exception of the San Diego area. **Ralph Ullum** is district manager in charge of all sales activities in the greater San Diego area and Imperial Valley.

O. L. CLEVENGER was promoted to senior supervising engineer in the technical division of Humble Oil & Refining Co.'s Baytown (Tex.) refinery. He supervises a group of engineers engaged in the mechanical designing of refinery piping and equipment.

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DEPT/Service & Equipment Companies

J. A. Grundy

W. B. Noble

J. A. GRUNDY has been appointed operating vice-president of Reed Roller Bit Co., Houston. Grundy, formerly vice-president of manufacturing, will direct all Reed operations except sales and finance. **WILEY B. NOBLE**, vice-president, has been named to a new executive liaison post. Noble, formerly head of engineering, will carry out sales engineering liaison activities between Reed's management and the company's licensees and customers. **G. J. Gilbert**, formerly assistant chief engineer, has been appointed chief engineer. **R. G. Stockton** is the new materials manager, responsible for purchasing, production control, material control, stores, and shipping in the Houston plant. He was formerly purchasing agent. **T. B. Ellis**, formerly chief industrial engineer, is the new factory manager. He will be in charge of industrial engineering and manufacturing engineering, and will be responsible for the production facilities at the Reed plant.

D. M. GRIFFITH, Houston district sales manager of Jones & Laughlin Steel Corp., is in charge of the company's new resident sales office, opened by the company on Dec. 1. **R. E. Schrock** is sales representative at the new offices, and **Richard L. Tuck** is field engineer.

W. W. HICKS has been appointed truck dealer for Four Wheel Drive Auto Co., with headquarters at FWD's sales and service center in Duncan, Okla. Hicks will sell four- and six-wheel-drive FWD trucks to oil well servicing contractors and to manufacturers of truck-mounted drilling, pulley, and workover equipment.

PAUL F. TAFT has been appointed a chemist with Girdler Catalysts, the products division of Chemetron Corp., in Louisville, Ky. Taft will work in the physical measurements laboratory with **Dr. W. M. Keely**, section supervisor.

WAINWRIGHT HOLT, JR., was appointed sales manager of centrifugal and axial compressors for Allis-Chalmers Mfg. Co., in New York. Holt joined Allis-Chalmers in 1951, as a representative for petroleum and chemical sales, in the New York district.

SIDNEY A. LEWIS has been appointed manager of technical sales service and manager of bronze valves sales for Walworth Co., New York. Lewis will be responsible for the activities of the technical sales service group, whose members are specialists in marketing a particular product or group of products in a particular industry. Lewis joined Walworth in 1955 as manager of the plastic division sales.

WILLIAM R. PENLAND is the new assistant southeastern division manager of Corrosion Rectifying Co., with headquarters in Lafayette, La. Penland, with Coreco since 1957, was formerly associated with Service Pipe Line Co. and Sohio Pipe Line Co.

D. L. ROSE is the new waterflood engineer in the production equipment section of the general product sales department of Jones & Laughlin Supply Division, in Tulsa. Rose, with Jones & Laughlin since 1952, has been engineer in the general products sales department, at Tulsa, since 1956.

IDECO, INC., one of the Dresser Industries, Dallas, has been appointed exclusive export sales representative for Walker Well Heads, Inc., Tulsa. Ideco, manufacturer of drilling equipment, has agents, affiliates, and service representatives in active oil areas throughout the world.

TOM S. MOUGHON has joined Brewster Co., Shreveport, La., as project engineer. He was most recently manager of the South Louisiana district for Unit Rig Co. In his new position with Brewster, he will be special project engineer for the development of new products.

T. S. Moughon

B. H. Pickard

B. H. PICKARD has been elected president of Tuboscope Co. International, subsidiary of Tuboscope Co., Houston. In addition to its operations in the Middle East, Tuboscope is planning to establish bases of operations in Western Europe, South America, and the Far East.

LLOYD HELMER and **DON WILSON** are sales representatives for Larkin Products, Ltd., Canadian subsidiary of Larkin Packer Co. Helmer will be responsible for the Calgary territory, and Wilson the Edmonton territory.

EUGENE J. HOUDRY, inventor of the catalytic cracking process to convert crude petroleum into high octane gasoline, and founder of Houdry Process Corp., will receive the 53rd Annual Perkin Medal, for outstand-

ing achievement in applied chemistry, on Jan. 9. Houdry was selected by a jury representing the American section of the Society of Chemical Industry, the American section of the Societe de Chimie Industrielle, the American Chemical Society, and the American Institute of Chemical Engineers.

W. T. (Tom) PEARSON has joined Atlas Pipe, Inc., as salesman in the Houston office. He was previously district sales manager for Lone Star Steel Co., also in Houston.

JOHN DOYLE is the new district manager for Welex, Inc., at Winfield, Kan. He was formerly field engineer at Winfield.

J. Doyle

F. E. Sandefer

F. E. (Bake) SANDEFER was promoted from area service manager to division manager of the Four Corners area for Houston Oil Field Material Co. He will be in charge of sales and services, and will operate from offices in Farmington, N. M. **Jack E. Lindell** is Sandefer's assistant.

GEORGE W. PLOHR has been appointed marine sales engineer for Dravo Corp., Pittsburgh. He will serve customers in the upper Ohio River area. Plohr has been a sales engineer in Dravo's chemical process equipment department since 1956.

B. J. (Bill) BUCY is the new division engineer of The Western Co.'s Oklahoma City Division. Bucy, with Western since 1951, was most recently electronics and explosives engineer at the company's Midland (Tex.) research facilities.

HEMAN R. POWERS has been elected to the newly created position of executive vice-president of National Aluminate Corp., Chicago. He was formerly vice-president and general manager of the industrial division. **Herbert S. Johnson** has been named general manager of the industrial division, succeeding Powers.

GLENN H. CROCKER has been appointed general sales manager of Roots-Connersville Blower Division, one of the Dresser Industries, with headquarters in Connersville, Ind. He will be responsible for the division's sales in the United States and Canada. Crocker has been with Roots-Connersville since 1948, as field engineer, chief application engineer, and manager of factory sales.

C. J. ROSKER, formerly sales agent of National Supply Co. in Argentina, has joined the staff of Armco Argentina SA Industrial y Commercial, Buenos Aires. Armco Argentina has recently been appointed sales representative for National Supply's oil field machinery and equipment and tubular products in Argentina.

ROSS A. PFAFF is head of the new mechanical engineering, research, and design department of World-Wide Instruments, Inc., Houston. World-Wide manufactures portable gravity meters for petroleum and mining exploration.

W. F. DICKINSON has been appointed sales specialist in Azusa, Calif., for steel pipe manufactured by Southern Pipe, a division of U.S. Industries, Inc. Dickinson represented the Fabricated Steel Division of United States Steel before joining Southern Pipe.

ADEJANDRO FUENMAYOR SOTILLO is sales representative for Tubular Lining Corp., in Venezuela. He will have offices in Caracas.

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Construction Project Manager, Graduate engineer, age 41, 20 years industrial experience. Organization, coordination and construction of complete refinery and chemical plant installations. Have following of one or more complete job organizations, experienced field supervisors, office warehouse, etc. Foreign assignment preferred. Will relocate. Top salary expected. Available March 1st. PW-9540, Petroleum Week.

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High Tariff or Mandatory Control

THE TIME HAS COME, we believe, for the industry to unite behind higher tariffs as a solution to the perplexing problem of oil imports. This is the only real alternative to mandatory control.

Slowly, but inevitably, we have been moving down that road. Even before this magazine reaches you, the government may have announced some form of compulsory regulation, if only a stop-gap action.

But bear this point clearly in mind: It will not take long for "temporary" controls to become permanent ones, and the industry will be living with them forever.

Remember this, too: Such controls, once started, will steadily grow tighter, until every facet of the industry is included. Have no doubt about that.

We believe that few men—in or out of government—really want this. The prospect causes strong men to shudder.

WHAT CAN BE DONE to prevent such a development? We've already tried no controls at all. And that didn't work. Maybe it would now, when we consider the alternative of mandatory controls, but it's doubtful. Too much emotion has been aroused. Too many minds have been made up.

And we've tried "voluntary" controls. To be frank about it, if any voluntary plan is to be effective for long, it must have enforcement provisions. That, of course, is tantamount to mandatory regulation. Furthermore, the Justice Dept. has cast doubt on the legality of voluntary action.

That brings us back, then, to higher tariffs. Admittedly, there are arguments against hiking tariffs. But no plan on earth is going to be fair to everyone.

What has to be the deciding factor here is what would be best for the nation as a whole and the industry as a whole.

All thinking men will agree that this nation needs—must have—a healthy, active oil industry. It must not be drowned in foreign oil, and it must not be strangled by endless controls. The very nature of the oil industry demands freedom to be bold, to take risks, to move forward aggressively.

At the same time, no one seriously believes that we can shut ourselves away from the rest of the world.

HIGHER TARIFFS WOULD DO THE JOB of keeping imports at a proper level—without the legal risks of a "voluntary" program, and without facing the stifling effects of a mandatory plan.

The time for a decision is running out. If the industry hesitates, or stands divided, it is going to wind up eventually with strict government regulation.

The time to speak up is right now. What are you going to do about it?

Congrats and $25 to John R. Ewing, P. O. Box 174, Broussard, La.

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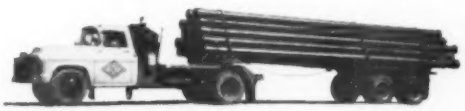

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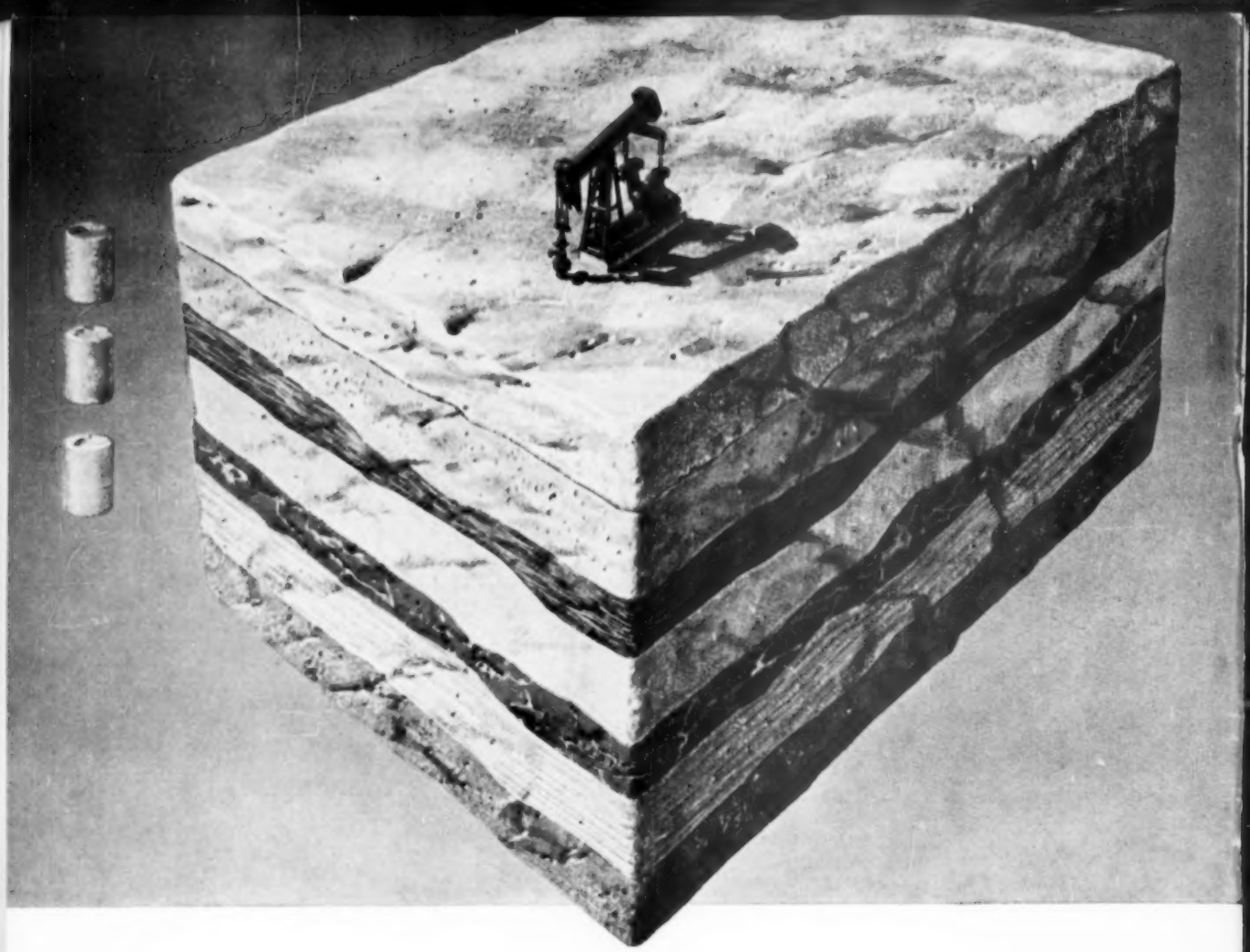

Could this be your marginal well?

If you're operating a marginal well, this illustration could be a portrait of that well. Close examination of your well logs may reveal additional zones of potential productivity and a chance for increased production—with the *right* acidizing or fracturing treatment.

Here, for example, are three adjacent oil-saturated intervals within a single section. They have dissimilar porosities, permeabilities, and acid solubilities. Production from any *one* interval would not pay out; from *two* would be marginal, but from *all three* would make a good commercial well.

The problem is to devise a treatment, economically feasible, that would stimulate all three intervals to maximum production. It's not an easy task, but Dowell engineers are doing it every day.

Dowell is the only service company with twenty-six years experience in oil well stimulation work. And Dowell has the wide assortment of chemicals, additives, and temporary plugging agents required to tailor treatments for practically any formation.

Have any marginal production? Let your Dowell engineer help you check your well records for additional production possibilities. This is a good time to take another look at your stripper wells. Dowell, Tulsa, Oklahoma.

Services for the oil industry

DOWELL

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